THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. JANUARY 24, 1895. CHICAGO, ILL. NUMBER 4.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The iron trade has come down to the last week of January with little change in actual conditions since the opening of the year, but with increasing signs of the enlarged volume that will result from present planning. The week has brought further evidence that the year will be fairly active in lake shipbuilding and demand from that source already has brought several good contracts into the mills. Structural work on foot in the East, beside the big contract noted last week, will make mills in that section comfortable, once specifications begin to come in. That the incursions of Western mills, so notable a year ago, have been checked in the East of late, may be attributed in part to the maintenance of more uniform rates by the railroads—a policy that promises to prevail more and more. It is apparent that the period of unprofitable prices in finished material is not over and that the tonnage of early delivery orders does not go well around while the mills wait for projected work to materialize. In markets East and West bars and plates are showing this excess of producing capacity. Pig iron, apart from the firmer feeling in Bessemer, shows further signs of weakness. There has been little selling since the new year opened and buyers are pressing for inducements to place even moderate orders. The statistics show that the accumulations of iron due to the enlarged production of the past six months have been at Eastern foundry iron furnaces, the charcoal furnaces of Michigan and the Bessemer producing stacks of the Central West. The South, having only moderately increased its production over the first half of '94, added but little to its unsold stocks. The policy of its chief producer to refuse far forward sales at present prices is thus better reinforced than would be a like stand by Northern furnaces. Among makers of Bessemer pig in Ohio and Western Pennsylvania, the practical certainty of a small advance in ore prices may help to maintain the better feeling noticed in the past ten days, but the reduction on coke freights proves a partial offset, as the tendency will be to give that to the buyer. Sales of Bessemer pig at $10 to $10.15 Pittsburg are reported, and at $9.45 in the Valley. The filling up of several mills on billet contracts has strengthened that market, and $14.85 to $15 Pittsburg is the present range. The starting of the Youngstown plant next week, and the prospect that metal will be converted at Lorain in the second quarter of the year would indicate that any upward movement will not go far. Large orders for rails are still held back. An Ohio mill has taken contracts for 2,500 tons. Its advent into the rail market is regarded with much interest.

THE CLEVELAND OUTLOOK.

There is little to add to the statement of last week concerning the efforts of the producers of standard Bessemer ores to make a stand against ruinous prices and excessive production. While the probabilities of agreement are greater than they were a week ago and amount almost to a fact, there are further conferences to be held. That standard Bessemer hematites will be sold at $2.90 in 1895 there is now every likelihood. The analysis of the figures on Bessemer pig iron production in 1894, as given on another page, with the statement that Lake Superior Bessemers were consumed in the second half of 1894 at the yearly rate of 6,700,000 tons, has an important bearing on the matters now under discussion. Another question of immediate interest to iron ore companies is the proposition of the commissioners of Ohio counties in which iron ore is stored on dock to subject the ore piles to taxation. Already Ohio has a record for discriminating against industrial capital in the making and enforcement of tax laws, and this latest proposition is calculated to react as other similar efforts have done. Iron ore lies on the docks because of the peculiar relation of the mining industry to navigation. Ores must be hauled from the mines between May 1 and Dec. 1. They cannot all be sold before they are brought down and all that is sold cannot go to furnace yards as fast as it comes down. It is a convenience to maintain piles on dock. To tax it is as unjust as to tax grain in elevators or coal that comes from the mines in the spring and stands on the docks waiting to be transferred to boats. The mining companies already pay the bulk of the taxes of the towns built up about their properties; in Michigan they pay one cent a ton on all ore mined; in Ohio their stockholders pay taxes on their stock. Now it is proposed to add the injustice of a third tax. The result of such a policy would simply be to transfer unsold ores to Erie and Buffalo docks and drive a traffic out of Ohio, that has furnished work for thousands of men and enriched every port that it has touched.

Pig Iron. There is very little trading in Bessemer iron in the valleys. A transaction is reported the past week at $9.45 furnace, but offers have been made on a lower basis, one of these, deducting freight and commission, representing $9.25 to the furnace. The heavy purchases reported for delivery at Lorain simmer down to about 20,000 tons of valley metal apart from the output of a Cleveland furnace for the balance of the year. The same buyers are reported to be negotiating for a furnace, and if the deal is made, may be out of the market for some time. The Ohio Steel Co's plant starts the coming week and its demand is counted on to strengthen the tone of the market. Foundry iron is slightly improved in demand, but the change is scarcely perceptible.

Finished Material. A Chicago bid at a low figure took the local ship plate contract let last week, though Pittsburg and Cleveland competition was close. There are signs of some retaliatory prices on other classes of material. All classes of finished product that begin with billets continue on the low basis of recent weeks, buyers of billets being still able to place orders at $15.50 delivered in Cleveland. While the Pittsburg market is reported firmer, the advent of the Youngstown mill into the market increases competition. Bar iron and steel are no stronger; valley mills, however, are rather better employed.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

There has been a little improvement noticeable in both the number and amounts of sales made in the past week, but it is only slight. The best feature of the market is the continued hopeful feeling that predominates among the larger dealers, who seem to think that the demand for material will be much larger during next month than it has been in January. Pig iron was in better demand last week, although no very large sales were made. Some classes of consumers of bars are asking for prices, and a few yearly contracts of fair fair have been placed. In rails, billets and rods very little has been done, although the inquiry is still large, and it is likely that next month will develop considerable business. The largest sale of the week was of plates and miscellaneous shapes for the steamer which was contracted for last week, to be built by the Chicago Shipbuilding Co. Other classes of material show little change.

PIG IRON.—A little more buying was done last week than in the week before, but the largest sale made was only for 1,000 tons, of local iron. Aside from this a few smaller sales of local iron were made, and as there are still several buyers who are in the market for large lots whose wants are unsatisfied, there is fair promise for the next few weeks. Rumors are heard of prices being cut, but transactions at the reported figures can not be located. It does not seem probable that the local furnaces would find it necessary to lower their quotations from the market in order to secure business, as buyers have apparently come to the conclusion that prices made at the present time will hold. Southern iron has been very quiet, with only a few small orders taken. The market is rather weak, and so many of the dealers are making sales under our quotations that we lower the minimum figure 25 cents. There are one or two buyers in the market for round lots that will probably purchase within the next two or three weeks, and the competition is expected to be keen on these deals. Foundrymen are taking iron on their contracts very rapidly, and in many cases are using up what they have already bought much faster than they had anticipated. This is true of both Northern and Southern irons, and is an encouraging feature. Our quotations are as follows:

Lake Sup. Charcoal	$13 00@14 50	Southern No. 2 Soft	9 75@10 25
Local Coke Fdy. No. 1	10 25@10 50	South'n Silveries No. 1	$11 50@11 75
Local Coke Fdy. No. 2	9 75@10 00	South'n Silveries No. 2	11 25@11 50
Local Coke Fdy. No. 3	9 40@ 9 65	Jackson Co. Silveries	15 00@16 00
Local Scotch Fdy. No. 1	10 25@10 50	Ohio Silveries No. 1	14 00@14 50
Local Scotch Fdy. No. 2	9 75@10 00	Ohio Silveries No. 2	13 00@13 50
Local Scotch Fdy. No. 3	9 50@ 9 75	Ohio Strong Softeners	12 50@13 00
South'n Coke No. 1	11 00@11 25	Alabama Car Wheel	17 50@18 00
South'n Coke No. 2	10 00@10 50	Malleable Bessemer	11 00@11 50
South'n Coke No. 3	9 75@10 25	Coke Bessemer	11 00@11 50
Southern No. 1 Soft	10 00@10 50		

BARS.—While some contracts have been closed by wagon makers for their season's supply, the general market has been rather quiet, with only a few comparatively small sales closed. Prices are weak, and common bar iron is now selling at 1.05c; guaranteed iron is quoted at 1.15c to 1.20c, and soft steel bars from strictly billet stock are selling at 1.20c to 1.25c.

RAILS AND TRACK SUPPLIES.—Business has been rather quiet as regards sales, only a few small orders having been taken. Some of the large roads are in the market, however, and will undoubtedly close within the next few weeks. Prices are unchanged at $23 for rails; splice bars, 1.30c to 1.35c; track bolts, 1.95c to 2c; spikes, 1.65c. to 1.70c.

BILLETS AND RODS.—The wage scale at the Joliet mills stands in a fair way to be settled within the week, but the billet mills have not started up yet. The inquiry for billets is good, and it is probable that the mills can be filled with orders as soon as they are ready to run. Quotations are still made at $17. The inquiry for rods is small, and no large sales were made in the past week. The quotations are continued at $23 to $23.50.

STRUCTURAL MATERIAL.—The important transaction of the week was the sale of about 1,200 tons of plates and 300 tons of other shapes to go into the steamer for which a contract was taken last week by the local ship yards. General trade was quiet, with only small sales. Prices are made as follows: Beams and channels, 1.45c to 1.50c; angles, 1.35c to 1.40c; plates, 1.40c to 1.45c; tees, 1.55c to 1.60c. Small lots from store are quoted at from ¼c to ½c higher.

PLATES.—The demand is still light for this month, but inquiries are received that indicate a better volume later. Prices are as follows: Tank steel, 1.35c to 1.40c; flange steel, 1.50c to 1.75c; firebox steel, 2c to 5c; boiler tubes, 75 per cent. discount.

MERCHANT STEEL.—Some dealers report a fair trade; others have made only small sales. Quotations are unchanged: Open-hearth spring, tire and machinery steel, 1.65c to 1.70c; smooth finished tire and machinery, 1.50c. to 1.60c.; Bessemer bars 1.35c. to 1.45c.; tool steel, 5.50c to 7.50c.; specials, 11c. and upwards.

SHEETS.—A good business has been done in both black and galvanized sheets, but the former have sold almost entirely for future delivery. Prices are as last reported: No. 27 common iron, 2.30c to 2.35c; steel sheets, 2.40c; galvanized sheets, 80 per cent. discount.

OLD RAILS AND WHEELS.—No large business is reported for any class of material, and the market is nominal. Old iron rails, $10.25 to $11; old steel rails, $6.50 to $7 for short, and $8.75 to $9 for long lengths; old car wheels, $8.50 to $9.

SCRAP.—A small business has been done, and the outlook is not particulsrly bright. Prices are only nominal: No. 1 forge, $8.50 to $9; No. 1 mill, $6 75; No. 1 machinery, $7.25; axles, $12.50 to $13; cast borings, $3.75; wrought turnings, $5.25; axle turnings, $6.25; mixed steel, $5.25; heavy cast, $7.50 to $8; stove plates, $5.75 to $6; heavy melting steel, $6.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. The conditions noted a week ago continue substantially. In Bessemer pig there is a firmer feeling and sales of moderate amounts have been made at $10.10@$10.15 the past week. One valley sale is reported of 2,000 tons at $9.45 at furnace. The demand for this metal has been light, but while furnacemen have good-sized stocks there is less pressure to sell. It is evident that the transactions at the low prices of three and four weeks ago have been made the most of, and some of the figures that are mentioned in rumors are almost beyond belief. The reports as to the attitude of ore companies are thought to have some weight with makers of Bessemer pig, and it is believed the worst is over and that the firmer feeling now noticeable will be maintained. Forge iron has sold down to $9.15 and there is little promise of better things. Foundry iron is unchanged. More iron is going forward, but orders for immediate consumption are of small volume. The better feeling in billets continues and a number of sales were closed the past week. The river mills that took on contracts at the low figures of December are full for the next two or three months. There have been sales at $14.80 @ $14.90 the past week and some makers hold for $15. The Edgar Thomson mill is on rails, but a counter influence of weakness is the starting up of the new Ohio Steel Co.'s

plant, which is understood to have a converting contract of considerable size from a pig iron and steel selling firm. The demand for finished material is reported somewhat improved. Several orders for bar iron have been placed in the week, though the volume in this direction is scarcely up to expectations. Prices are the lowest yet made. The structural mills are well employed on miscellaneous small orders, with greater activity ahead on account of large work that is projected. Local engineering firms are figuring on some large business. The increased activity of tin plate plants will help the steel mills and in wire rods, while there is no immediate business of moment, it is reported that one or two mills are well sold ahead.

Buffalo. Except for a gradual resurrection of business from the holiday dullness, there is nothing of interest to report concerning the conditions of the past week. There is more or less contracting for the coming half or whole year under negotiation, but no general movement of any sort. Prices remain at such a point that there is no room for cutting.

Boston. The iron business, which was very flat just after the commencement of the new year, has once more assumed a more flourishing condition, and some fair-sized orders have recently been booked. Just previous to the first of January, some of the furnaces showed an inclination to shade prices, in order to stimulate business, which at that time of the year has always been quiet. We do not think it resulted in their securing much additional business, for the time being. The larger furnace companies are holding to their prices, and now that consumers are buying more freely, more firmness is expected, although the stocks in sellers' hands will hardly justify any early advance in values.

Cincinnati. Nothing has occurred in Western iron markets to break the monotony. Business goes along in a way that would be fairly satisfactory, perhaps, if the trade had not been looking for better things after the new year. Iron is accumulating to some extent, both North and South, but the surplus stock is less than it was a year ago, and it would be soon absorbed if an improvement in demand sprung up. When this improved demand is coming is what a good many people would like to know. Expected orders for cars and railroad supplies continue to be held back in a way that shows that the waiting mood still prevails among railroad officials. The reflection gives some comfort that there will be more of it, when it does come. The amazing cheapness of construction of iron and steel structures of every kind must stimulate activity to a marked degree, as soon as capital acquires a little more confidence. Current orders for pig iron cover all varieties, and while they are, in most cases, small in size, there are a great many of them, and the aggregate is at least respectable. There has been no change in prices North or South during the week.

BIDS for water pipe opened by the city of Cleveland this week were as follows: Lake Shore Foundry Co., $17.85 for pipe delivered on streets, and $40 to $50 for special castings; Howard Harrison Co., of Bessemer, Ala., $18.50 on cars in Cleveland; James B. Clow & Sons, Chicago and New Philadelphia, O., bid $18.43; Chattanooga Foundry & Pipe Works, $19.37 to $20.37; Anniston Pipe & Foundry Co., $19.90 to $20.05. The bid of the Lake Shore Foundry Co. last year was $19.45. The contract now about to be awarded amounts to $75,000.

THE production of pig iron in Belgium for the month of December, 1894, amounted to 79,670 tons, as against 63,085 tons in December, 1893. Total production for the year 1894, 904,710 tons as against 708,075 tons in 1893.

LAKE SUPERIOR IRON MINES.

The Norrie and Pabst mines at Ironwood, Mich., are now employing 1,000 men.

At the Newport mine on the Gogebic, 200 men are now employed. At the Ashland mining and stocking are in progress. There is some talk of a resumption of operations at the Sunday Lake mine on the same range.

The Starwest mine at Palmer, Mich., formerly known as the Wheat, is now employing 40 men and an output of 40,000 tons is aimed at the present year.

The average of phosphorus in the test pittings so far made on the Mahoning Ore Co.'s properties about Hibbing, Minn., is reported to be .068. It is stated, however, that the high phosphorus ore is so located that it can be sorted out without large expense. It will be possible for the company to mine 300,000 tons this year. A new property is being explored west of Hibbing, with good ore indications but considerable water.

New machinery is to be put in at the Pioneer mine on the Vermilion, including a compressor plant and new hoists.

Severe weather has delayed operations at the Mountain Iron, on the Mesabi. Five steam shovels have been at work stripping since the close of navigation. Work is pushed day and night on account of the rapid freezing.

The Sheridan Mining Co. would resume at its Menominee range property if a proper reduction of royalty from the present figure of 30 cents could be secured. Fifteen cents is the outside figure that would be considered.

S. D. Dessau, of New York, representing the Millie Mining Co., has been in the Lake Superior region lately endeavoring to secure a reduction of the royalty on Millie ore. He expressed a willingness to resume and give work to 200 men, if the fee owners would consent to a reduction from 60 to 30 cents. It is stated that the Milling Mining Co. has been reorganized and will have sufficient capital to operate.

It takes a good deal of denying to keep the daily papers straight on Lake Superior iron ore news. Secretary Coffin, of the Minnesota Iron Co., Chicago, says of the report that that company is to enter the Gogebic range and that there will be a fight for supremacy on the Mesabi between it and the Rockefeller company: "The reports are doubtless an echo of the story sent out from Duluth last summer to the effect that Rockefeller had purchased all the Lake Superior iron ore mines and was going to form a gigantic trust. The Minnesota company has not entered the Gogebic field and at present has no intention of doing so. We are mining ore to sell, the the same as Mr. Rockefeller's mines are, and as we sell to the same customers there is sharp competition between us, of course. There is, however, nothing which could be called a war in this business competition, nor is there anything in the way of a trust to control prices even considered."

The outcome of the litigation between fee owner and lessees of the Cincinnati property on the Mesabi is thus reported by Duluth papers: John McKinley and the Standard Ore Co. have forfeited their lease on the Cincinnati mine at Virginia, owned by John R. Williams of Duluth, and the property now reverts to Mr. Williams. The 10 days allowed by the court in which the ore company and McKinley might pay the back royalties and comply with the terms of the lease if they wish it continued, have expired and judgment has been entered against them.

The stripping and open pit mining at the Winthrop on the Marquette range will not be continued in the spring as the high silicon ore thus obtained is about exhausted. About 50,000 tons was taken out and most of it shipped. The Marquette *Mining Journal* says: "Mining work has been resumed at No. 2 shaft of the Winthrop mine. The machinery recently transferred from the old mine is working satisfactorily and hoisting has been started. About 100 men are employed at the workings. These were transferred from the open pit where stripping was in progress during the past year or so. No. 2 mine is looking well. It is estimated that there is about 100,000 tons of ore in sight, the greater part of it non-Bessemer. The ore runs about 61 per cent metallic iron and is quite low in phosphorus. Mr. F. Braastad, who is working the mine under contract, says that the main shaft will be sunk 35 feet deeper. It will then be 490 feet in depth."

The Auburn, on the Mesabi, will employ 200 men by Feb. 15; 500,000 tons can be mined in 1895.

THE IRON TRADE REVIEW

DEVOTED TO
IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES, IRON ORE PRODUCTION, TRANSPORTATION, AND GENERAL INDUSTRIAL PROGRESS.

PUBLISHED EVERY THURSDAY BY
THE IRON TRADE REVIEW CO.,
CLEVELAND, OHIO.

CLEVELAND:
27 VINCENT STREET.
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CHICAGO:
1141 MONADNOCK BLOCK.
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TERMS OF SUBSCRIPTION, (strictly in advance):

One year	$3 00
Six months	1 50
Three months	75

Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW, through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE IN CLEVELAND, O., AS SECOND CLASSMATTER.

JANUARY 24, 1895.

POINTS IN THE PIG IRON RECORD.

The official figures for pig iron production in 1894 are tabulated on another page of this issue and are an interesting contribution to the history of iron and steel-making in a notable year. Taking the figures for output, together with those of unsold stocks, it appears that 6,721,768 tons of pig iron went into consumption in the year, since unsold stocks decreased 64,380 tons, which amount is to be added to production. In 1893, even with the heavy consumption of its first four or five months, 6,968,550 tons passed from maker to consumer. Thus, while production was 6.5 per cent less in 1894 than in 1893, consumption fell off but 3.5 per cent.

The comparison of Bessemer pig iron production in the two years, particularly in the districts supplied with Lake Superior ores will be studied with interest. The increasing use of steel is reflected in the growing percentages of Bessemer iron. In the past three years the showing for the United States is as follows:

	1894.	1893.	1892.
Total pig iron, gross tons	6,657,388	7,124,502	9,157,000
Total Bessemer, "	3,808,567	3,568,598	4,444,041
Per cent Bessemer	57.2	50.9	48.5

Looking now at the districts supplied with Lake Superior Bessemer ores: Illinois, from producing 358,592 tons of Bessemer in 1893, rose to 543,309, but failed to regain the second position among Bessemer producing States which it lost to Ohio in 1893. Ohio's total for 1894 is 589,940 tons, against 421,197 tons in 1893 and 639,183 tons in the big year 1892. Allegheny County made a gain over 1893 and the Shenango valley a notable gain. The marked increase in the use of Bessemer pig for various forms of steel products, to the displacement of wrought and cast iron appears in the following statement of output in the Pennsylvania and Ohio districts named. We give the production of Bessemer in 1892, 1893 and 1894, and of foundry and forge for the years 1893 and 1894:

	Foundry and forge. 1894.	Foundry and forge. 1893.	Bessemer. 1894.	Bessemer. 1893.	Bessemer. 1892.
Lehigh valley	147,168	265,089	77,037	115,726	201,579
Schuylkill valley	222,816	311,338	50,688	104,204	90,240
Upper Susquehanna	479	15,366	86,801	89,169	105,136
Lower Susquehanna	7,883	32,844	225,186	310,427	373,709
Juniata	41,499	94,206	.....	.....	128,531
Shenango valley	117,389	168,206	341,515	234,496	176,205
Allegheny County	251,244	326,252	1,530,835	1,370,955	1,324,101
Miscellaneous Pa. Bit.	83,037	41,893	182,036	158,253	218,760
Mah. Val. and Hang. R'k.	264,955	314,892	168,202	121 171	183,740
Hocking valley	1,472	8,041	26,460	25,873	35,186
Miscellaneous Ohio Bit.	30,330	112,848	395.278	274,153	420,257
	1,168,272	1,690,965	3,084,038	2,804,427	3,257,444

The total of foundry and forge irons produced in the above districts in 1892 was 2,027,477 tons; so that there was a falling off last year of over 850,000 tons from 1892, and of more than 500,000 tons of foundry and forge from 1893.

The remarkable expansion of Bessemer pig iron output in the second half of 1894 is the noteworthy fact about the tables given in another part of this issue. From 1,501,487 tons in the first half of the year, it bounded to 2,307,080 tons in the second half, and that, too, in the face of the fact that the coke scarcity had not spent itself so far as the Mahoning and Shenango Valley furnaces were concerned, until two months had passed by of the second half. The figures give fresh emphasis to what has been noted in these columns on several occasions of late—and this is the most tremendously significant movement in pig iron production in years—namely, that the Bessemer output is being furnished by the districts immediately tributary to Lake Erie, while in the Eastern Pennsylvania districts it is dwindling to insignificant proportions. From being 899,195 tons in 1892, and 619,526 in 1893, the Bessemer pig iron production in the Lehigh, Schuylkill, Upper and Lower Susquehanna and Juniata Valleys fell to 439,712 tons in 1894, or less than half what it was two years before.

The past year has thrown the Bessemer pig production to the furnaces that could produce cheapest and in the second half of the year the districts included in the Shenango Valley, Allegheny County, Miscellaneous Western Pennsylvania, Ohio and West Virginia advanced from 1,089,963 tons in the first six months to the surprising total of 1,634,963.

Carefully separating the districts supplied entirely with Lake Superior Bessemer ores, in the above reckoning, and allowing for the moderate amount sent east of the Alleghenies, it would appear that Lake Bessemers entered into nearly 3,300,000 tons of the Bessemer pig output of 1894. In the second half of the year 2,000,000 tons of pig were produced from Lake Superior Bessemer ores, a rate of 4,000,000 tons a year. This would require, at a moderate estimate, 6,700,000 tons of ore. If, then, 1895 should keep up the pace of the second half of 1894 and the same districts should monopolize the output as in the six months just past, there would be such a consumption of Lake Superior Bessemers as has never been approached in a single year within a million tons.

The position of the nine Southern States in the column of producers is a matter of interest in view of what has been happening the past year in the Chicago district. The States of Maryland, Virginia, North Carolina, Alabama, Texas, West Virginia, Kentucky and Tennessee produced the following amounts in the years stated:

	1894	1893	1892	1891	1890
Product'n by So. States	1,268,425	1.567,299	1,890,167	1,708,966	1,744,160
Per cent. of total	19	22	20.6	20.6	19

It appers, therefore, that the contribution of the Southern States to the total has fallen back to the percentage of 1890, after a slight increase in the intervening years.

A FACTOR in estimates as to the future of the iron trade is the large amount of mill work that is on hand in the conversion of plants to new uses, the erection of new mills and the enlargement of others. With all its previously reported expansions, tin plate manufacture has contributed several important projects recently. Cast iron pipe contracts are being made by a number of municipalities, and at the lowest figures ever recorded. Wire rod mills

are busy and a number are sold well ahead. Wire nails at 85c. have been an active market of late. Only the largest output can stand such a price, and another determined effort for an advance is talked of.

THE CINCINNATI CONVENTION.

Thoroughly representative of the industrial interests of the United States, and thoroughly in earnest in the purpose that called them together, the members of the Manufacturers' Convention now in session at Cincinnati may be expected to come to results of the highest importance to industry throughout the country. The proceedings have not had the space they merit in the dispatches from Cincinnati, but the movement may be expected to make itself felt, once momentum is gained, in a way that will tell in columns of commercial statistics if not in the columns of newspapers. The attendance was large and the most important commercial and manufacturing bodies in the country were represented.

The local committee had prepared, so far as it could, for the avoidance of the welter of talk from men with hobbies to ride, that has often interfered seriously with the accomplishment of definite results by a body so unwieldy and likely to be side-tracked if not held well in hand by its officers. The things aimed at were well stated in the preliminary circulars, and the delegates knew just what they were called together to consider.

Thomas P. Egan, who was made temporary chairman and later permanent chairman of the convention, laid stress in his opening address upon the hardship to which American manufacturers had been subjected in the sudden cutting off of the reciprocity arrangements by which they had built up a promising trade—a trade that was valued more than ever when the depression at home so sharply cut off the demand that had always been counted on. That on this subject there was little division of sentiment among the 1,000 delegates present appeared from the ready adoption of the resolutions as far as reported, with the reciprocity paragraph as of foremost importance. The resolutions adopted are as folllows:

Resolved, That the National Association of Manufacturers adopts the following as the basis of its organization:

To the largest possible extent our home market should be retained and supplied by our own producers, and our foreign relations should be extended in every direction and manner not inconsistent therewith.

The principle of reciprocity should be embodied in the national legislation, in accordance with the requirements of equity, so that reciprocal trade relations between the United States and foreign countries may be developed.

Believing that ships sailing under the flag of the United States should carry our entire mari ime commerce, and in view of the injury thereto by subsidized foreign shipping, we declare in favor of a judicious system of subsidies in order to complete restoration of our merchant marine.

The Nicaragua Canal being essential to the commerce of the United States, and of national importance, we favor its construction and operation under the control of the Federal Government. Our national and artificial waterways should be improved and extended by the Federal Government to full needs of commerce, connecting the great lakes with the rivers of the Mississippi Valley and the Atlantic seaboard.

An early decision of the convention was in favor of organizing a National Manufacturers' Association, as a permanent institution. That it will cut an important figure in efforts for commercial extension in foreign countries need hardly be said. It will require generalship, however, to keep from running afoul of party platforms. Reciprocity has been badly entangled with partisanship of late.

PERSONAL.

Ernst Prochasta, recently of Birmingham, Ala., has been appointed superintendent of the open-hearth department of the Otis Steel Co., of Cleveland.

E. C. Potter, who was connected for a number of years with the Illinois Steel Co.'s South Chicago plants, has sailed from San Francisco for Japan. His trip is in response to a cablegram from the Japanese government, which seeks advice as to the location and construction of a steel rail and armor plate plant. The investment will be several millions.

A. T. Hay, inventor of the Hay steel, died at Burlington, Ia., Jan. 22, aged 69. He built the first all-steel bridge across the Missouri river and brought out a number of valuable discoveries in electricity and metallurgy.

Samuel Mather, of Pickands, Mather & Co., has been appointed to represent the Chamber of Commerce of Cleveland on a trip to Eastern cities to gather information relative to board of trade buildings in that section, in view of the contemplated erection of such a structure in Cleveland.

Coke Freights Reduced—Heavy Production.

A reduction of freight on Connellsville coke, to go into effect Feb. 1, is the latest important development in connection with that interest. This makes the Pittsburg rate 65 cents, instead of 70; the rate to Valley furnaces, $1.20 instead of $1.25, while the Cleveland rate is reduced from $1.65 to $1.55, and that to Chicago from $2.75 to $2.65. Coke production in the Connellsville region was 150,070 tons in the week ending Jan. 12—a total only twice exceeded in the past six months of heavy production. There were 14,573 ovens active—the largest number in three months. Shipments were 8,143 cars. Operators, in the effort to keep their plants well employed, have been taking contracts freely at $1, and it is reported that some 90c. coke is being shipped.

Shipments in the last four months of 1894 exceeded any record for four months in that region, says the *Courier*. The total production in 1894 was 5,454,451 tons. In but three other years has tois been exceeded: 1889, 1899 and 1892. The output of the region was 5,825,826 tons in 1889; 6,221,518 tons in 1890: 4,929,960 tons in 1891; 6,200,691 tons in 1892, and 5,054,797 tons in 1893.

THE Lodge & Davis Machine Tool Co., of Cincinnati, O., has just received an order from the Vulcan Maschinenfabriks-Actien Gesellschaft, of Wien, Austria, for several of its engine lathes to be driven by direct connected motors. This concern is one of the leading manufacturers of Wien and is in the center of an extensive electrical district. They propose to do away with overhanging shafts, pulleys, etc., and arrange all their tools to be driven exclusively by motors. The Cincinnati company states that it is receiving quite a number of inquiries from Germany for motor driven tools, and that there seems to be an unusual amount of interest manifested in the new system.

At Homestead, Pa., a number of the employes of the Carnegie Steel Co. mills had another meeting with Amalgamated Association officials on Sunday, Jan. 20, in spite of the discharge of a number of workmen who attended the previous meeting of that sort. Speeches were made protesting against the action of the company as an encroachment on the liberty of the men. Steps were taken to organize lodges of the Amalgamated Association, but it was announced that the subsequent meetings would be secret.

ONE of the handsomest catalogues received is that of the Nicholson File Co., of Providence, R. I. Within the flexible morocco covers are 60 pages of fine engravings showing the factories and offices of this company, and the 3,000 makes of files manufactured by it. The Nicholson File Co. was founded in 1864 by Mr. William T. Nicholson. Business was dull for some time as the prejudice against machine made files had to be overcome. Mr. Nicholson kept the products of his company constantly before the public; the business grew and at the time of his death in October, 1893, the output was 3,000 files per day.

6,657,388 GROSS TONS IN 1894

PIG IRON PRODUCTION AND STOCKS.

With the promptness characteristic of the statistical work of General Manager Swank, the American Iron and Steel Association has published tables relating to pig iron production in the United States in 1894. From these we extract the tables and deductions given below:

The total production of pig iron in 1894 was 6,657,388 gross tons, against 7,124,502 tons in 1893, 9,157,000 tons in 1892, 8,279,870 tons in 1891, and 9,202,703 tons in 1890. The production in 1893 was 2,032,498 tons, or over 22 per cent. less than in 1892, and the production in 1894 was 467,114 tons, or over 6½ per cent. less than in 1893. The production in the first half of 1894 was 2,717,983 tons, and in the last half of 1894 it was 3,930,405 tons. In the following table we give the production of pig iron by half years during the last four years, in gross tons:

Periods.	1891.	1892.	1893.	1894.
First half	3,368,107	4,769,683	4,562,918	2,717,983
Second half	4,911,763	4,387,317	2,561,584	3,939,405
Total	8,279,870	9,157,000	7,124,502	6,657,388

The production of pig iron in the last half of 1894, large as it was as compared with that of the first half of the year, was not so large as in the first half of 1893, or in either of the half years of 1892, or in the second half of 1891, or in either of the half years of 1890, or in the second half of 1889. The total production of pig iron in 1894 was the lowest yearly production since 1888.

The number of furnaces which were in blast on June 30, 1893, immediately after the panic of that year, was 226; by December 31, 1893, the number in blast had fallen to 137; on June 30, 1894, there were only 108 in blast; on December 31, 1894, the number in blast had increased to 185.

The statement of production by states in each of the half years, with active stacks June 30 and December 31, is as follows:

TOTAL PRODUCTION OF PIG IRON.

States.	Blast Furnaces. In blast June 30, '94	Dec. 31, 1894. In	Out	Total	Production. Gross tons of 2,240 lbs. (Includes spiegeleisen.) First half of 1894.	Second half of 1894.	Total for 1894.
Massachusetts	.....	1	3	4	.....	156	156
Connecticut	2	2	5	7	3,369	4,047	7,416
New York	4	4	23	27	91,611	83,574	175,185
New Jersey	4	4	9	13	36,878	26,395	63,273
Pennsylvania	45	80	116	196	1,350,466	2,019,686	3,370,152
Maryland	2	.....	9	9	3,974	1,626	5,600
Virginia	8	9	23	32	146,215	151,871	298,086
North Carolina	.....	.....	2	2	.....	.....	.....
Georgia	2	1	4	5	22,540	17,728	40,268
Alabama	11	15	37	52	255,950	336,442	592,392
Texas	1	1	3	4	2,223	2,448	4,671
West Virginia	.....	2	2	4	23,932	56,849	80,781
Kentucky	.....	2	7	9	19,639	14,215	33,854
Tennessee	6	8	14	22	100,223	112,550	212,773
Ohio	9	36	28	64	332,804	567,225	900,029
Indiana	.....	.....	2	2	.....	.....	.....
Illinois	6	10	9	19	216,121	388,674	604,795
Michigan	4	5	15	20	46,309	48,862	95,171
Wisconsin	2	3	7	10	38,372	53,223	91,595
Minnesota	.....	.....	1	1	.....	.....	.....
Missouri	.....	1	3	4	892	5,630	6,522
Colorado	2	1	2	3	25,465	48,204	73,669
Oregon	.....	.....	1	1	1,000	.....	1,000
Washington	.....	.....	1	1	.....	.....	.....
Total, 1894	108	185	326	511	2,717,983	3,939,405	6,657,388
Total, 1893	226	137	381	518	4,562,918	2,561,584	7,124,502

PRODUCTION ACCORDING TO FUEL USED.

Anthracite	31	34	103	137	412,047	502,695	914,742
Charcoal	22	24	92	116	102,697	119,725	222,422
Bituminous	55	127	131	258	2,203,239	3,316,985	5,520,224
Total	108	185	326	511	2,717,983	3,939,405	6,657,388

Special interest attaches to the figures showing production in certain districts, the significant phase of these statistics, which are given immediately below, being the marked increase of production in the second half of the year over that for the first half:

PRODUCTION IN CERTAIN DISTRICTS.

		Blast Furnaces. In blast June 30, '94	Dec. 31, 1894. In	Out	Total	Production. Gross tons of 2,240 lbs. (Includes spiegeleisen.) First half of 1894.	Second half of 1894.	Total for 1894.
Ohio. Pennsylvania.	Lehigh Val.	10	9	32	41	92,539	131,666	224,205
	Schu'lk'l "	6	11	17	28	127,914	145,590	273,504
	U. Sus. "	3	2	11	13	46,780	40,500	87,280
	L. Sus. "	5	7	20	27	81,639	151,430	233,069
	Juniata "	1	3	10	13	10,055	31,444	41,499
	Shenango "	.....	15	6	22	152,199	306,700	458,899
	Allegheny Co.	17	24	3	27	748,651	1,033,428	1,782,079
	Mis. bit.	1	7	4	11	87,702	177,371	265,073
	Charcoal	2	2	12	14	2,987	1,557	4,544
	H. R. bit.	1	8	6	14	22,200	55,420	77,620
	Mahoning Val.	.....	10	4	14	120,529	235,008	355,537
	Hocking "	1	1	11	12	19,585	8,347	27,932
	Mis. bit.	4	11	3	14	164,704	260,904	425,608
	H. R. char.	3	6	4	10	5,786	7,546	13,332

PRODUCTION OF BESSEMER PIG IRON.

New York	19,612	.....	19,612
Pennsylvania	995,321	1,498,777	2,494,098
Maryland	2,309	.....	2,309
West Virginia	23,932	56,849	80,781
Kentucky	2,895	.....	2,895
Ohio	236,146	353,794	589,940
Illinois	196,144	347,165	543,309
Missouri	892	.....	892
Wisconsin	.....	5,207	5,207
Minnesota	.....	.....	.....
Colorado	24,236	45,288	69,524
Total	1,501,487	2,307,080	3,808,567

PRODUCTION OF BESSEMER PIG IRON IN PENNSYLVANIA AND OHIO DISTRICTS.

Ohio. Pennsylvania.	Lehigh Valley	25,111	51,926	77,037
	Schuylkill Valley	20,016	30,672	50,688
	Upper Susquehanna Valley	46,301	40,500	86,801
	Lower Susquehanna Valley	74,127	151,059	225,186
	Juniata Valley	.....	.....	.....
	Shenango Valley	99,107	242,408	341,515
	Allegheny County	676,449	854,386	1,530,835
	Miscellaneous bituminous	54,210	127,826	182,036
	Mahoning Valley and H. Rock bit.	56,677	111,525	168,202
	Hocking Valley	19,585	6,875	26,460
	Miscellaneous bituminous	159,884	235,394	395,278

The stocks of pig iron unsold, in the hands of the manufacturers or their agents December 31, 1893, and not intended for their own consumption, were 662,068 gross tons; on June 30, 1894, they had fallen to 517,036 tons; on Dec. 31, 1894, they had risen to 597,688 tons—an increase from June 30 of 80,652 tons. The increase in stocks since June 30 has been chiefly in the charcoal State of Michigan, in the Lehigh Valley, in the Shenango and Mahoning Valleys, and in Alleghany County, Pennsylvania. In the Shenango and Mahoning Valleys, and in Allegheny County, which are the most important Bessemer pig producing centers, the unsold stocks December 31, excluding all metal intended for the use of the makers, were 95,261 tons; on June 30, 1894, th se stocks were only 12,321 tons. Unsold stocks in the Lehigh Valley December 31, 1894, were 58,704 tons, against 34,057 tons June 30. In Michigan unsold charcoal stocks were 74,672 tons December 31, against 49,411 June 30, 1894. The unsold stocks of iron by states, or by groups of states, were as follows on the dates named:

STATISTICS OF UNSOLD STOCKS.

States.	Gross tons of 2,240 lbs. June 30, 1893.	Dec. 31, 1893.	June 30, 1894.	Dec. 31, 1894.
New England	12,222	16,623	15,387	12,019
New York	44,866	42,976	36,033	36,705
New Jersey	11,368	20,417	15,659	11,291
Pennsylvania	151,858	193,286	118,398	188,217
Maryland	2,178	2,525	3,703	4,459
Virginia	42,350	73,921	62,110	40,779
North Carolina, Georgia and Texas	17,071	18,495	18,868	21,554
Alabama	73,188	69,067	70,261	78,130
Kentucky	5,580	5,381	9,263	5,972
Tennessee	25,562	25,452	22,982	17,853
Ohio	67,454	111,737	43,198	66,046
Michigan, Indiana, and Minnesota	45,891	29,028	51,411	74,672
Illinois and Wisconsin	14,770	16,360	17,639	7,843
Missouri and Colorado	32,845	34,298	30,824	30,948
Pacific States	1,938	2,502	1,300	1,200
Total	549,141	662,068	517,036	597,688

In addition to the stocks of pig iron above noted as unsold on Dec. 31, 1894, there should be added 63,640 tons in the

yards of the American Pig Iron Storage Warrant Company, which had passed out of the hands of the makers, making 661,328 gross tons which may be said to have been then on the market, against 575,866 tons, which were similarly held on June 30, 1894. The total quantity of stocks in warrant yards on Dec. 31 was the largest yet recorded, amounting to 111,200 tons. Nearly all of it was in the South.

There has been a steady increase of unsold charcoal stocks in the hands of makers during the last four half-yearly periods, as will appear from the following figures: June 30, 1893, 184,536 tons; Dec. 31, 1893, 207,181 tons; June 30, 1894, 229,705 tons; Dec. 31, 1894, 250,183 tons.

IMPROVED DEVICE FOR LATHES.

It has been customary to secure certain classes of work for turning on a lathe, by the use of a two-jawed chuck on the live spindle. This necessitated the stopping of the lathe to remove each piece of work, the opening of the chuck with wrench or key, the adjustment of the next article, the closing of the jaws and the starting of the lathe. This series of operations often requires more time than the forming of the work. The device invented by W. L. Cheney, of the Meriden, (Conn.) Machine Tool Co., as shown in the three cuts herewith, making the "chuckes" or placing in position of the work a matter of but a moment. It is adapted to lathes used in forming keys, draw-pulls and similar articles having a shank either straight or of longitudinally irregular contour and provided with a wing, bit or lug at the end. Of the illustrations, Fig. 1 represents in perspective so much of a lathe as will indicate the purpose of the invention. Fig. 2 is a central vertical section of a portion of the device; Fig. 3 is a vertical section at right angles to that shown in Fig. 2. The operation of the device is thus described by the inventor:

"The article F to be turned may be a hand e, key or other piece of metal or other material formed with a wing or lug at or near one end. The lathe is set for use by retracting two of the pins D and securing them in that position by means of their set screws *d'*. The remaining pin is thrust forward, as shown in Fig. 1, and similarly secured. The choice of the actuating pin is determined by the length of the wing or lug on the article F. The article to be turned is then placed between the centers C and E. When not in use the point of the live center C projects beyond the end of the pin D, as shown in dotted lines, Fig. 2. When the dead center is brought forward, *i. e.*, to a position nearer the head A, the live center C is forced backward, the spring C′ yielding to the pressure of the operating lever, or the like, by which the dead center is moved. As the article F is brought nearer to the face of the spindle B its wing is struck by the pin D, as shown in Fig. 1, and forced to rotate with the spindle. After the operation of turning or forming is completed the dead center E is retracted by the operator, the spring C′ forces the live center C and the article F to follow until the wing on the article F is clear of the pin D. The article may then be easily taken from the lathe or by a further retraction of the dead center E allowed to drop through the lathe frame into a suitable receptacle. Another article may then be introduced as before. It will be observed that there is no necessity of or advantage in stopping the lathe either to insert or to remove the work."

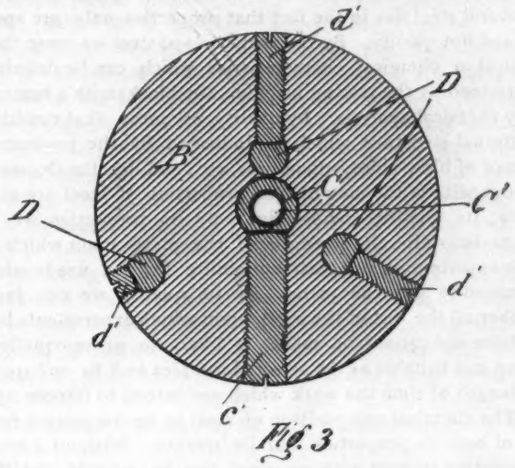


Fig. 3

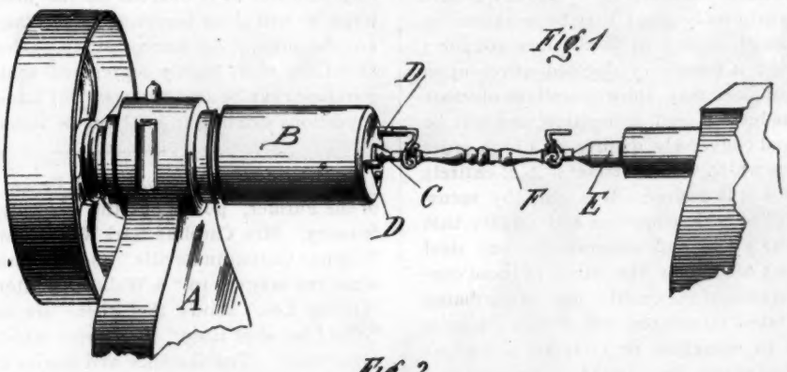
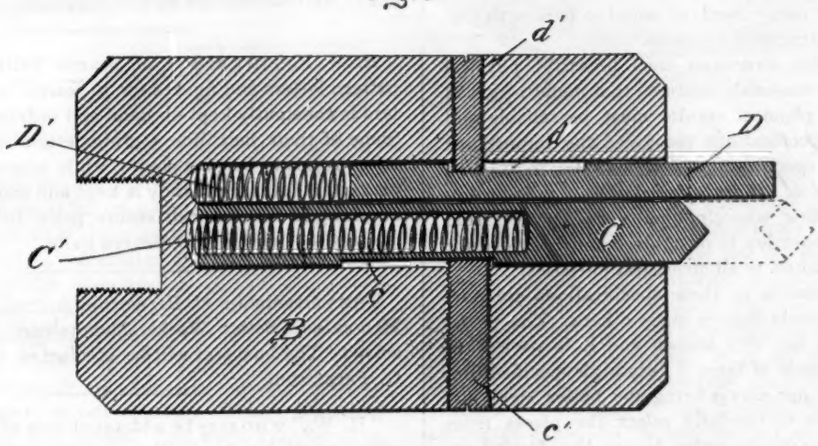


Fig. 1

Fig. 2



IMPROVED DEVICE FOR LATHES.

E. R. Blaine has resigned the position of business manager of the *Cosmopolitan* and associated himself with the Proctor & Collier Co., of Cincinnati. This company, while not the largest advertising agency in the country, has a good line of customers, including a number of well known industrial concerns.

MAHONING valley mills are running fuller than in weeks.

SPECIFICATIONS FOR STRUCTURAL STEEL.

In connection with the "general specifications for structural steel" sent out by the American Engineering and Inspection Association of Albany, N. Y., several pages of explanatory and descriptive notes are given. From these we take the following introductory observations:

The chief defect of almost all modern specifications for structural steel lies in the fact that properties only are specified and not quality. By the properties of steel we mean those physical or chemical characteristics which can be definitely determined by the testing machine, the blacksmith's hammer, or by chemical analysis. By quality we mean that condition of internal structure which is indicated by the presence or absence of blow-holes, sponginess, etc., and by the degree of homogeneity of the metal. The properties of steel are absolute; its quality, comparative. By its properties we are able to determine the strength of the pieces upon which we make experiments and their suitability for the use to which we intend to put the metal. By its quality we can judge whether all the rest of the steel, upon which experiments have not been and cannot be made, is likely to prove equally as strong and suitable as the selected samples and to endure for any length of time the work which we intend to impose upon it. The chemical composition of steel is an important function of both its properties and its quality. Without a sound constitution to start with no steel can be reliable. Skillful manipulation may conceal to some extent the symptoms of a bad constitution, but cannot effect a cure.

The method of manufacture and the processes used in furnace work, have an important bearing upon the *quality* of steel and comparatively little effect upon its *properties*. Rolling mill manipulation *may* affect quality, as by unskillful heat treatment a constitution originally good may be weakened or destroyed, but the process of rolling in itself does not affect the quality of steel, though it has a very decided effect upon its properties. A piece of steel may show excellent ultimate strength, elastic limit, reduction and elongation, and still be of a very poor quality, and conversely, quality of a high order may exist with properties which would render a steel entirely unfit for the use for which it is desired. It is only by securing the requisite standard of both properties and quality that we can feel assured of the safety and endurance of any steel structure. To the neglect of one or the other of these considerations (but almost always of the quality) may be attributed a good many failures of steel structures which seemed most mysterious; and failure to recognize or understand the importance of both considerations has caused in the past and still continues to cause many users of metal to look with distrust on any steel for structural purposes.

Most specifications for structural steel prescribe physical tests alone; it being erroneously assumed that metal which in test pieces shows good physical results must be reliable and lasting. A very few specifications recognize the importance of quality, but these specifications are confined to steel of definite and special kinds. It is believed that the following specifications are the first wherein quality, as distinct from and independent of properties, is recognized and provided for in all kinds of steel adapted to all structural purposes.

The physical requirements in these specifications are purposely made more moderate than in many others. The possibilities of steel making are well known and it is useless to make specifications outside of them. Very high specified limits for physical tests do not always bring any better steel, but only make it necessary to carefully select the places from which the test pieces are cut in order to get the desired results. Sometimes, especially if these limits are not well "balanced" among themselves, they are a temptation to the manufacturer to put special treatment on the test pieces. They lead the purchaser, too, to a false sense of security in his structure, giving him the idea that the whole of the metal is of the character which the steel maker sometimes knows is only possessed by selected or possibly specially treated test pieces. It is believed to be better to specify such physical limits as the poorest part of a piece of steel should show, and which can be obtained without undue expense or extraordinary manipulation by any skillful maker. And this, of course, carries the inference that the purchaser or his inspector possesses sufficient knowledge of steel making to select his samples for testing from the places which will give the poorest results. The strength of a structure, like that of a chain, is the strength of its weakest link; and there would seem to be little use in making experiments on the strongest links while we do not know what the weakest one will bear. Some specifications are in use wherein the limits are so fixed that it is absolutely necessary to carefully select the best places in order to get results fulfilling the requirements, because steel cannot be made whose worst parts will satisfy the conditions.

There are natural phenomena incident to the manufacture of steel which tend to make certain portions of the ingot (and the steel rolled therefrom) poorer thad the rest. The most important of these is segregation—which means the tendency of certain chemical constituents to separate from the others and gather by themselves during the process of cooling from a molten condition, so that in a solid ingot the chemical elements are by no means uniformly distributed. Unfortunately the segregating tendency is highly developed in the case of phosphorus, which is at the same time the most intense element in its influence towards making the steel brittle, or "cold short." Consequently, while an analysis of a sample from the molten metal at the time of casting will give the *average* amount of the different constituents of the steel, it is quite certain that some parts of the ingot will contain more and some parts less of certain constituents than the average, with a corresponding variation in the quality and properties of the finished steel. At the most highly segregated points the phosphorus element may exist in double the amount found in the least segregated portions. It is useless to specify against this natural phenomenon and unwise to ignore it. It is better to recognize it and provide for it, as is done in these specifications, setting such limits as will not be impracticable or to onerous for the manufacturer on the one hand, or will allow segration to become dangerously excessive on the other. By having an inspector of sufficient skill to select the most highly segregated spots for an analysis, the purchaser can be absolutely sure of knowing the worst possible conditions existing in his steel on account of segregation.

In February *Lippincott* Fred Perry Powers, in "The Fate of the Farmer," points out the growing evils of agricultural tenancy. Mrs. Caroline Earl White describes the festival of "Corpus Christi in Seville," and Dr. Charles C. Abbott shows what one may see in "A Walk in Winter." Francis Lynde, in "Quong Lee," shows that there are some good Chinamen. "The Chapel of Ease," by Harriet Riddle Davis, is the complete novel. The sketches and stories are all up to the standard so well maintained by this magazine.

H. W. Knight & Son, of Seneca Falls, N. Y., have made pattern letters and figures for 30 years. A large stock of letters is constantly kept on hand and orders are filled promptly. Some of their hair line Gothic letters are so small that it takes 10,000 to weigh a pound, while others weigh 20 pounds a character. A large variety is kept and manufacturers desiring anything in this line can secure price list and discounts by addressing Drawer 1126, Seneca Falls.

The partnership of Fernstrum & Fred, proprietors of the Menominee Boiler Works, Menominee, Mich., has been dissolved. The business will be conducted hereafter by Frank G. Fernstrum.

"H. W.," who may be addressed care of *Iron Trade Review* office, wants "a shear either new or second-hand, suitable for cutting cold steel in sections either flat or square of 12 square inches."

The Ironton Structural Steel Co., located in Duluth's suburb, is about to build two open hearth furnaces, to be completed June 1. An extension of buildings 100x200 feet will be made.

W. F. Robertson Steel & Iron Co. succeed Evans & Robertson at Cincinnati, W. F. Robertson having purchased the interest of Chas. W. Evans.

At the Pittsburg Bridge Works the men are on double time and work on hand will last four months.

TWO NEW BOILER MAKERS' TOOLS.

The Prentiss Tool and Supply Co. have just put out two new boiler makers' tools which we illustrate in this issue. The first one is a machine for rapidly and accurately forming Eclipse manholes and nozzles in steam boiler heads, tanks, heaters and similar work, reducing the cost of this labor to a minimum as compared with methods heretofore employed.

The design and construction are simple, enabling an unskilled workman to operate it. The base upon which the table is mounted is 30″ x 30″ x 24″ high. The table is 24″ x 78″ with Tee slots extending through its entire length and securely bolted to the base. The vertical ram is made of cast steel, 3′ in diameter, which passes through a heavy bearing in base, forming a guide way for the pressing ram. The levers are made of mild steel, 1″ x 5″. The driving gears are 3½″ face 1½″ pitch, very strong and durable. The upper end of the ram is threaded to receive the compression nut, with handles. The machine is driven by two pulleys, tight and loose, 18″ x 7″, and should make 250 revolutions per minute.

The second cut shows a facing machine with a boiler head clamped in position by four clamping bolts which pass through heavy dogs securely fastening the work to the table, it being provided with Tee slots extending through its entire length, permitting boiler-heads of the following diameters to be clamped thereon: 78″, 72″, 66″, 60″, 56″, 54″, 48″, 36″, 30″ and 24″. The table is mounted on a cast base, 30″ x 30″ and 24″ high, having a bearing 8″ long in the bottom of the base, to receive a steel spindle 5″ diameter and 31″ long passing through the bearing in the table to receive the facing-head with cutter. The feed adjustment is regulated by a hand wheel on top of the facing machine, as shown. The driving mechanism is simple, consisting of a driving pulley, worm and worm-wheel. The worm and wheel run in oil, avoiding danger of cutting or getting out of order. When facing off man-holes, flanges, etc., it is claimed that work may be done on this machine at a saving of 60 per cent. over other methods of doing similar work. A pulley, 12″ x 6½″ face, arranged with clutch and lever for starting and stopping machine dispenses with shifting belts. The speed of the driving pulley on the machine should make 175 revolutions per minute. Weight of machine complete, 1,800 pounds. Floor space required, 30″ x 78″.

Further details will be given on application to the Prentiss Tool and Supply Co., 57 S. Canal St., Chicago.

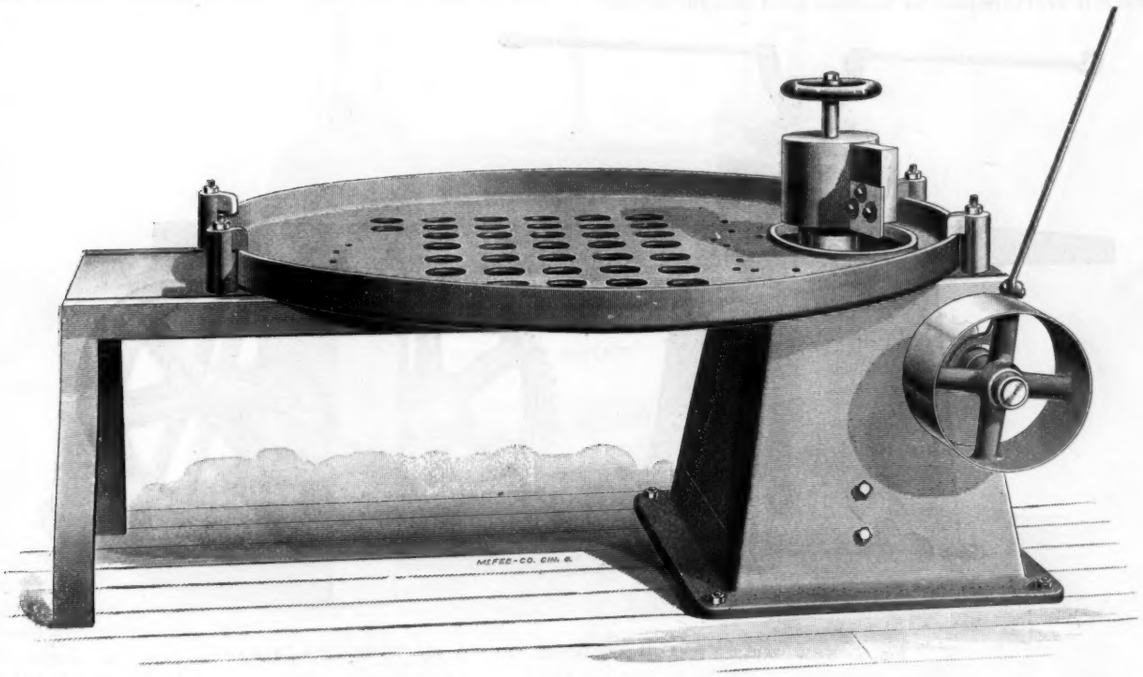


FIG. 1.—NEW MANHOLE AND NOZZLE FORMING MACHINE.

THE Superior Steel Co. is about to erect an additional annealing furnace at its plant at Carnegie, Pa., and to put in new engines at its cold mill.

ELECTRICALLY DRIVEN MACHINERY.

There have been many cases of the use of electric motors to drive lines of shafting or isolated parts of plants to prove conclusively the remarkable increased efficiency obtained, especially where the conveyance of steam for a long distance was necessary. This has led to a more thorough study of the amount of power absorbed by the line shafting and countershafts, writes W. E. Hall in *Cassier's* for February. "The minimum loss that can be looked for, and this is obtained only in exceptional cases requiring constant vigilance, is 25 per cent of the total power developed, and more frequently runs as high as 65 to 70 per cent. A safe average would be from 40 to 50 per cent, although the actual loss must be determined for each and every case. With the use of electric motors, when properly designed and proportioned for the work, as, indeed, is as necessary in electrical work as with any other problem of mechanics if the best results are desired, this percentage of loss can be materially reduced. An inefficient result must be expected with bad electric engineering just as with a poorly arranged case of millwrighing, but, the electrical proportions being once obtained, there will, within reasonable limits, be no decrease in efficiency from deterioration.

"The advent of electricity for such purposes seems to have enabled managers to realize more fully than ever before the loss accompanying what was heretofore generally accepted as the most efficient method of furnishing power to the individual machines of a plant. The use of electric motors in the place of shafting and on isolated machines where the motors are belted direct to the isolated shafts or to the machines has been sufficiently extended to render the verification of the results obtained unnecessary. It is no exception to find a reduction of 50 cent of the power consumed. This is not due entirely to the saving of loss through friction, but also to the advantage gained by the intermittent action of machinery of every kind. Tests show that where the motor drive has been substituted, the machines are in operation but little more than one-half the time, or, more correctly stated, the power required is only about one-half the total average power of the machines when doing work. As remarkable as these results may seem, sufficient data are on record to prove their correctness."

F. P. SHUMWAY, JR., 25 Brownfield St., Boston, who has had for his special field the preparation of catalogues and advertising, sends us a copy of "Effective Advertising," a handsomely printed quarto, containing specimens of advertisements prepared by him Their effective putting commends the originator to the attention of advertisers generally.

CASTINGS AND PATTERNS.

One of the troubles met with by the molder relates to warped and crooked castings. No matter how careful he may be, he will often be disappointed when his castings are removed from the sand to find many of them so warped and crooked as to render them unfit for use. He is frequently blamed on this account, when the fact is the fault lies with the patterns.

While it is true that many crooked castings are the result of carelessness or unskillful work, still there are many instances in which the patterns are constructed in so unworkmanlike a manner that the most capable molder finds it difficult, no matter whatever precautions are taken, to produce a perfect casting. He is often vexed and discomfited when the casting is taken from the sand to find it so warped and otherwise distorted as to make it unsuitable for the purpose for which it is intended.

It is very important, therefore, that the molder should be able to judge from the shape and style of the pattern whether the casting is liable to warp or crack in cooling. Sometimes, by taking proper care, a fairly straight casting may be obtained from a pattern of inferior construction; but, notwithstanding all the precautions which the most expert molders may take, patterns in many cases are so unskillfully constructed that it is next to impossible to obtain good, straight castings from them, and so much time is lost in the machine shop in hammering and finishing them before they are fit for use. This is especially true with many of the long frames used for both heavy and light machinery.

With such patterns the fault is often with the designer or pattern maker, in his endeavor to save a certain amount of metal. It is desirable, of course, to obtain the greatest amount of strength with the least amount of material; still the fact should not be lost sight of that, while the greatest amount of strength for a frame may be obtained with a light plate heavily ribbed, nevertheless the unequal shrinkage in the several parts may be such as to either warp or crack the casting in cooling. In either case the casting will be lost, or if not lost, double the time will be required by the machinist to get it in proper shape to be planed or otherwise fitted for use; and, as a rule, the time thus consumed will amount to more than the saving in material.

For this reason the careful and experienced designer should study these points, and, although he may find it necessary to put more metal in some parts of the pattern than is really required for strength, still it is often necessary to do so in order to avoid too much unequal shrinkage between the several parts and those which require greater strength. Cast iron, as well as other metals, expands with heat and contracts with cold, and the shrinkage from the melted state in iron to the normal state of the atmosphere averages about ⅛ of an inch to the lineal foot. Consequently, a frame that is to be 12 feet long in the casting requires a pattern of 12 feet 1½ inches. The pa ternmaker's rule is graduated in this manner, so as to allow for not only the shrinkage in length, but in all directions. Now, if the patterns for such frames are so constructed that a portion is much heavier than the balance, the lighter portion will cool first while the balance is sti l soft, with the result that the frame will separate at this point or be badly warped. Sometimes this tendency to warp or break may be partially prevented by removing a portion of the sand over the heavier parts, so as to give access to the air, and thereby hasten the cooling process. But this, of course, must depend upon the skill and judgment of the molder. Weights are also placed upon certain parts of the casting as soon as the conditions will admit; and this will generally counteract the tendency to warp. Here, however, the good judgment of the molder is also required, for if too much weight is used the casting is liable to be either broken or warped in the opposite direction. The skillful molder will, where the difference in thickness is not too great, or where heavy ribs are used—if the parts referred to are of easy access—generally so regulate the cooling process that a fairly straight and perfect casting may be obtained.

In all heavy castings—and light ones also, for that matter—it is the better practice to construct all parts of the pattern as nearly of uniform thickness as possible, even if it has to be done at a sacrifice of iron. There are certain c asses of work, however, such as pulleys and gearing, in which it is not practical to use the same quantity of metal in the rim as in the arms and hub. With large pulleys, where the rim and arms contain about the same quantity of metal (which is accomplished in modern patterns by using wide, flat or oval-shaped arms), but little difficulty is experienced; but where the hub is unusually large, the rim and arms are liable to cool first, and if straight arms are used they are liable to either break loose from the hub or strain the rim, so as to make a flat spot over each arm. Various methods have been resorted to by pattern makers to avoid this tendency, one of which is to make the arms crooked or curved, so that they will yield to this strain by slightly straightening.

Another method is to use a recessed core, that is, a core much larger in the center than at the ends, so that while sufficient thickness of metal is left at each end of the hub to fit to the shaft, the center is reduced to a shell of only sufficient thickness to support the arms and give sufficient strength for the purpose. Where no provision of this kind is made by the patte n maker, the molder must resort to his own methods. One of the most common is to uncover the hub as soon as the iron is sufficiently set and remove a part or the whole of the core, with a view to giving free access to the air; and not unfrequently water is poured into the center to further facilitate the cooling process. And, while this practice may be successful so far as the molder is concerned, it is not always the best for the machinist boring the castings. In many instances the

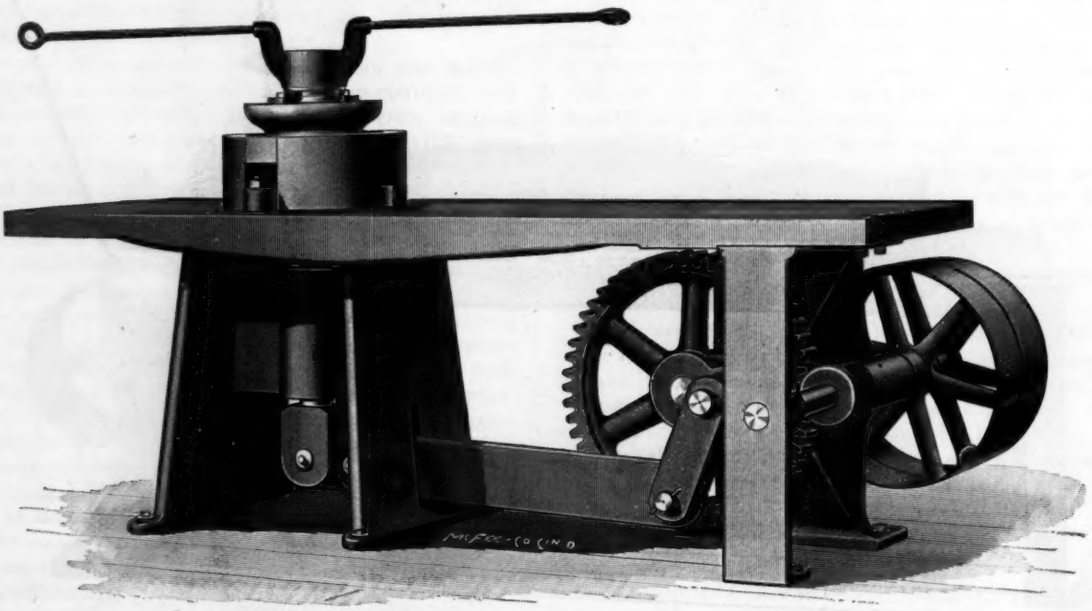


FIG. 2.—NEW BOILER-HEAD, MANHOLE FACING MACHINE.—SEE PAGE 11.

hubs are rendered so hard that it is a difficult matter to properly bore them, and tools and reamers are often spoiled in consequence. Hence, if the use of water is resorted to, the greatest care should be had so as not to reduce the temperature sufficiently to harden the iron. Cast iron possesses the same properties for hardening as steel, when submitted to the same conditions.—[Age of Steel.

Railroad Losses.

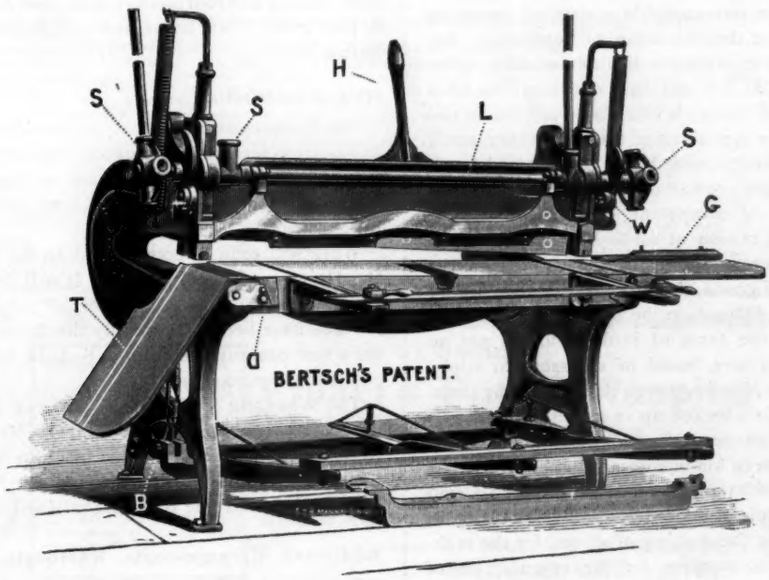
Referring to the financial condition of the country at large, the *Financial Chronicle* says that the condition of the railroads was of course very unsatisfactory. The railroad carrying industry is the largest of all of our industries, and the losses of earnings was simply tremendous. In the *Chronicle* of Sept. 1, we published a table showing that the falling off in the gross receipts of the United States railroads in the first six months of 1894 must have been $100,000,000. In the net revenues of course the loss was much smaller, and yet this loss of $100,000,000 in gross receipts means that the railroads had that much less money to spend, and what that implies in the way of diminished purchases of materials and supplies, and diminished employment of labor, is evident from the magnitude of the figures. The railroads had been doing poorly before, but under this great contraction in revenues the situation of many of them became very precarious. Reductions and suspensions of dividends were numerous. We may mention among others the decrease in the rate of distribution by the Rock Island, the Burlington & Quincy, the Northwest, the Baltimore & Ohio, the Michigan Central, the Canada Southern, the New York, New Haven & Hartford and the Boston & Maine, while the Louisville & Nashville, the Pittsburg, Cincinnati, Chicago & St. Louis (preferred), and several others, had to suspend dividends altogether. Just what the losses in net income have been in the calendar year cannot be determined for some time, as no sufficient data are available yet. But the statistician of the Inter-State Commerce Commission, in a preliminary statement published a short time ago, estimated the falling off in net for the year ending June 30, 1894, at over $50,000,000.

An Objection to Steel Tubes.

The art of welding steel is as yet but little understood in this country by boiler makers or blacksmiths, and this makes the use of steel tubes undesirable to railroads. Locomotive boilers give out in the front end, and by cutting off this worn part and welding on a new piece the salvage in an iron tube is so great as to make it really economical to pay a larger price for it. That this objection is but temporary we feel confident, for the necessary knowledge will soon be as general with the American workman as with his British or German brother. Steel cannot be welded the same as iron. It is really a surprise, says the *Boiler Maker*, that the art is so little practiced here. A boiler maker who visited last summer the boiler shops on the Clyde, Scotland, saw welding was carried on in every place he went.

EXTRA HEAVY GAP SHEAR.

Bertsch & Co., of Cambridge City, Ind., whose specialties are hand and power punches and shears, and bending, crimping and straightening rolls, have put on the market an extra heavy No. 2 5 ft. 15-inch throat gap shear of No. 14 iron. It is specially designed for trimming, squaring and slitting. In the accompanying illustration the patent lever attachment L, in front of the knife bar, has extra heavy sockets, S, at both ends, and is also operated, in conjunction with the treadle, for heavy work. For ordinary or light work the treadle can be used entirely independent of the lever. With this attachment the gap shear is complete, and for squaring and slitting is practically two machines in one. It is made for all lengths up to 6 feet or longer for light work, with 12, 15, 18 and 21-inch throat. The shorter sizes are made in lengths of 50 or 63 inches, so as to cut 8 or 10 feet in two cuts. The shears are made to be operated by either hand or power. The extension drop leaf table with parallel guage, G, is applicable for continuous accurate cutting of long sheets. Its use will facilitate the work and avoid marking off in slitting and trimming sheets, as the guage is adjusted in line with the blades, properly guiding the sheet through the throat. The extension table on the left has suitable parallel shearing lines, T, for trimming, and a special shear line indicator is attached to the last cutting end to indicate the cutting edge of the lower blade.



EXTRA HEAVY GAP SHEAR.

A Remarkable Piece of Steel.

A piece of Carpenter crucible steel exhibited at the Bridgeport meeting of the American Institute of Mining Engineers by John Birkinbine, has exhibited a tensile strength of 116,000 lbs. per square inch, an elastic limit of 89,170 lbs., an elongation of 25 per cent, and a reduction in area of 42 per cent. The test specimen had a length of two inches between fillets, and was an inch bar reduced to an area of 0.504 square inch. This unusual tensile strength was determined before the bar had been hardened; but a piece of the same, tested after hardening, is reported to have stood a stress of 214,000 lbs. per square inch. Another test piece is said to have shown 136,000 lbs. tensile strength, 97,300 lbs. elastic limit, 20 per cent elongation in two inches, and 40 per cent reduction of area. Mr. Carpenter claims that this steel, containing 2.27 per cent chromium and 1.04 per cent carbon, can be welded like iron, and has proved most desirable for the highest class of die steel.

H. R. IVES & CO., Montreal, Canada, have lately completed successfully a noteworthy piece of foundry work. They have made 440 large sections of pipe, 10 feet in diameter and five feet long, weighing between three and four tons each. Out of this large number there were only 17 defective ones from any cause whatever. These rings of pipe sections were used for culverts underneath the new Soulanges canal, allowing two rivers to run beneath the canal.

SHOP AND FOUNDRY NOTES.

"An engineer of my acquaintance," writes J. H. Allen, "showed me the drawings for a new machine tool the other day, in which the main frame was so designed that it was made to draw out of the sand and to need no core boxes whatever. He explained that the machine was intended for special work and that it was very improbable that more than one would be built; so when the patterns were to be made their expense with reference to the total cost had to be considered. On the other hand, when a large number of machines are to be built, it is advisable to save all the machine work possible by extra pattern work; and when only one is called for, it remains to be determined whether it will be cheaper to make patterns and complicated core boxes to cast on certain lugs and attachments, or whether it will not be best to face off on the planer and bolt these attachments in place. Good judgment must come in here and make the decision. Ordinarily it saves expense to spend money in the pattern shop, but for special work that is not to be duplicated no rule can be given."

***

The policy pursued in various cities in determining the value of taxable property of manufacturing concerns is a matter of serious import. The unreasonable course of assessing boards in some localities, in the valuation of equipment, has led certain establishments to consider the advisability of removing to other points. At Detroit this question has been having attention in view of the high valuations put on vessel property, and the excessive appraisals of the machinery outfit of manufacturers. One plant is now being transferred to an Ohio city, and other changes are agitated. A local paper editorially speaks the mind of competent authorities when it says: "It is not stretching reason at all to hold that when a given sum, say $100,000, is put into machinery adapted to the making of a special line of goods, the value of that machinery for the ordinary purposes of taxation becomes no more than could be secured for it in the form of junk. This is not an unreasonable doctrine for any board of assessors to apply. Take the Mayor's business, for instance. He has some hundreds of thousands of dollars locked up in machines and patterns for his own peculiar shapes and styles of product. While this stuff is all of full value in his business, what would be its actual cash value under the hammer? The same may be said of the hundreds of thousands of dollars that are locked up in machinery and patterns for the making of stoves, for the making of steam, water and gas supplies, for the manufacture of tobacco, for woodworking and metal manufacturing. Not a dollar's worth of the special machinery used in these lines is worth 10 cents under the hammer and it should not be taxed for more. The board of assessors have ample power to assess upon these lines. They are the judges of the actual cash value of such property as that described. It rests with them to determine that value. Hitherto they have determined it by its cost. Hereafter they should estimate it by its value as old iron, which is all it would bring on a forced sale."

***

The advantages of a grinder over a lathe are thus stated by an English firm of tool builders: "In the grinder the work revolves on dead centers, so that the work may be turned end for end without disturbing its truth. The spindle of the driving head in the grinder remains fixed, so that should any such inaccuracy exist it could not affect the work. An emery wheel requires only an infinitely small amount of pressure. The cutting power of an emery wheel is not affected to any appreciable extent by such variations of hardness or density. The surface produced by the grinder is uniform and true, and is susceptible of a high polish. The machine is specially constructed for preventing the access of emery dust to the slides, which, consequently, remain in good condition for years. The grinder operates with the same ease on hard as on soft work, so that hardened spindles, etc., may be employed where desirable at a cost but slightly in excess of soft. The grinder finishes the work of many lathes, and takes the responsibility as regards size and finish. The lathes simply rough out the work for the grinder, and a less skilled, and consequently less expensive, grade of labor can be employed on the lathes."

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

J. L. Girton, Winchester, Tenn., wants to buy pulleys and shafting.

The Ashland (Wis.) Foundry & Machine Co. has been incorporated with $30,000 capital.

The Aurora Foundry & Machine Shops, Aurora, Mo., will purchase a lathe, about 28-inch swing.

The Casey & Hedges Mfg. Co., Chattanooga, Tenn., is in the market for a 12-ton traveling crane; also a riveter.

The Empire State Pulley & Press Co. has been organized at Fulton, N. Y., to manufacture pulleys, presses, and other tools and machinery; capital, $20,000.

John Kramer & Bro., machinists, of Maria Stein, Mercer Co., O., want a sheer to cut one-eighth to three-eighths steel sheets, flanging blocks for one-quarter inch steel; also want shaper (new or second-hand).

Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until 2 P. M. Feb. 14, 1895, for all the labor and materials required for the iron and wood floor, ceiling and roof construction, roof covering, etc., for the U. S. post office, court house and custom house building at New Berne, N. C.

New Construction:—

The Pennsylvania Railroad is to erect a two-story iron repair shop, 40x60 feet, in Wilmington, Del.

A plant will be erected soon at Frankton, Ind., for the National Buggy & Bicycle Works, an industry recently secured by that city.

Work will soon be commenced on the new machine shop at the Homestead Steel Works. It will be 114x168 feet and of brick and iron.

Plans have been prepared by the Missouri, Kansas & Texas for a new passenger station at Sedalia, Mo. The building will cost about $30,000.

The Wheeling & Lake Erie Railway Co., it is said, will establish repair shops at Massillon, O. New buildings are likely to be erected there and new machinery purchased, and the business gradually withdrawn from the Norwalk shops, which were built before the road had attained its present magnitude.

Additions, Enlargements, Removals, Etc.:—

It is reported that the Kanawha & Michigan Railroad will in the spring remove its car shops from Corning, O., and Charleston, W. Va., to Point Pleasant, W. Va.

A large addition will be made to the New Castle, Pa., tin plate plant, increasing it by 10 mills, and giving employment to 1,000 men. With the additions it will be the largest plant in the United States. Norton Bros., of Chicago, will take a large proportion of the output for their stamping works. The New Castle Steel & Tin Plate Co. has closed a contract with the Morgan Engineering Co., of Alliance, O., for the most complete electrical plant in the world. It will consist of electric cranes and other time and labor saving machines for the manufacture of tin plates.

General Industrial Notes:—

The employes of the West Side Foundry, at West Troy, N. Y., have had a 15 per cent reduction in wages.

The Globe Iron Works, of Cleveland, will bid on two of the torpedo boats to be built by the government.

At the Tudor Iron Works in East St. Louis, a strike is on over an attempt to replace the boss rollers with lower-priced men.

The Anniston Pipe & Foundry Co. has made a shipment of cast-iron pipe to Honolulu on order. It was sent by way of San Francisco.

The Passaic Rolling Mill Co., of Paterson, N. J., is running three open hearth furnaces, two of them acid and one basic, making 750 tons per week.

An order has been issued for the sale of the Hayden Brass Works at Lorain, O., to satisfy a judgment on a mortgage for $271,761 held in New York.

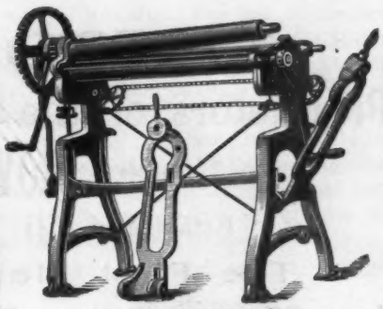
Machines for Working Sheet Metal.

Patent Gap Shears.

Patent Gap Shears, Especially designed for Squaring, Trimming and Slitting. 6 to 18 inch throat for Slitting Wide Sheets. Complete for Tin or Iron, to 14 gauge. Seven Styles of various lengths HAND AND POWER.

General Purpose Punch and Shear. Seven Sizes.

Rear Side.


Forming Rolls.

General Purpose Forming Rolls, all sizes. Quickly adjusted and instantly opened—A Revolution. Also Patent Crimping Rolls. Beware of Infringements.

BERTSCH & CO., Cambridge City, Ind.

SPECIALTIES:
Am. Crusher and Am. Ball Pulverizer.

THE AMERICAN MINING & MILLING MACHINERY CO.,

29 Euclid Ave., CLEVELAND, O. 280 Caxton Blk., CHICAGO, ILL.

The Simplest, Cheapest and Best Machines in the Market. Pulverize wet or dry to any degree of fineness. Make little or no slimes in wet nor dust in dry work. Four sizes, capacity from 2 to 60 tons per day.

SEND FOR CATALOGUE.
Cable Address, American.

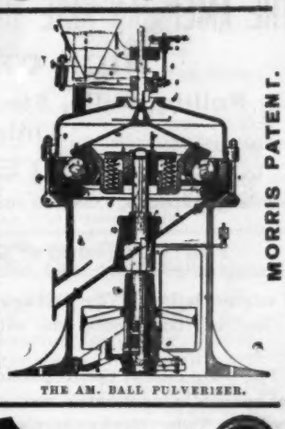
First Prize and Gold Medal Awarded by World's Fair, 1893.

Office of THE CLEVELAND IRON ORE PAINT CO. and THE GARRY IRON ROOFING CO.,
CLEVELAND, O., Jan. 25, 1894.

The American Mining & Milling Machinery Co., Cleveland, O.:

GENTLEMEN: We purchased a No. 2 American Rock Breaker and a No. 2 American Ball Pulverizer from your company about one year ago. The latter part of April, 1893, we started up for regular work, since which time we have run both of said machines to the full extent of our demands and to our entire satisfaction. The first 700 tons of hard iron ore that we pulverized for paint purposes was ground without taking the Pulverizer apart, and without expending one dollar for repairs for either of these machines. Of the 700 tons spoken of, about 200 tons was Lake Superior Specular iron ore, containing some 70 per cent. iron; a very difficult ore to pulverize. The remainder was a red fossiliferous iron ore, carrying quite a per cent. of silex, which cuts out buhr-stones rapidly. We find that the steel balls, which were when new 5 in. in diameter, now caliper 4⅞ in., and are perfectly round and smooth. The grinding track shows very little wear, and the driving track shows LESS; in fact, the wear is almost imperceptible. These two machines crush and pulverize more than one ton per hour with LESS than 12 H. P. We do not know of any Crusher or Pulverizer that can compare with the output of these two machines in quantity, quality, small amount of wear and tear, and like power. In our opinion, you cannot recommend them too highly. Very truly yours,

CLEVELAND IRON ORE PAINT CO.



THE AM. BALL PULVERIZER.

Save Your Patterns

MARKERS FOR
Fraser's Patent Rapping Plates

With all orders for Rapping Plates we now send markers for bit centers without extra charge. Try them and save your patterns and money.
MIL. F. S. CO.

BY USING

Fraser's Patent Rapping Plates and Lifting Screws.

Pattern Letters and Figures, Flask Clamps and Fittings,
Leather Fillet Cutters, Universal Trimmers, Dowel Pins, etc.

MILWAUKEE FOUNDRY SUPPLY COMPANY,
Successors to D. Fraser Mfg. Co. and Eagle Pattern Wks.
MILWAUKEE, WIS.

The Edgar Thomson Steel Works, at Broddock, resumed in full on Jan. 20. The rail mill will be busy for some months; orders are more plentiful.

The rumor is incorrect, that the Burden Iron Co., of Troy, N. Y., has been negotiating for the plant of the Troy Steel & Iron Co. for manufacturing steel shoes and rivets.

The Kensington Tin Plate Co. will accept the Amalgamated Association compromise tin plate scale, beginning work this week with union men. The non-union employes did not give satisfaction.

The shops of the Phœnix Iron Co., at Phœnixville, Pa., are busy with a section of a Chicago elevated railway contract, which is one of the largest contracts for structural steel given out last year.

The New Philadelphia (O.) Iron & Steel Co. has been delayed by attempting to run its rolling mill with one large engine and has arranged to put in a separate engine for each train of rolls.

J. R. Gemmill, Sharpsville, Pa., has been given the contract for the erection of the new stack, hoist and casting houses at the Spearman furnaces. They are to be of iron and will take about 400 tons.

During 1894 the Belfont Iron Works Co., Ironton, O., made 166,938 kegs of steel cut nails and 1,536 tons of muck iron. The Kelly Nail and Iron Co., at the same place, made in 1894 125,000 kegs of steel nails.

The output of the Eagle Iron & Steel Co., operating the Ironton Rolling Mill, Ironton, O., in 1894, was 8,960 tons of bar iron and 2,085 tons of sheet iron, or a total of 11,045 tons, against 13,389 tons in 1893.

The American Trust & Savings Bank, receiver, will sell on Jan. 31 the real estate and manufacturing plant at Harvey, Ill., of the General Engineering Co. At the same time bids will be received on the personal property.

The contract of the Bethlehem Iron Co. with the Russian Government is for 1,500 tons of un-Harveyized armor plate, 1,200 tons of which is 16-inch plate, and 300 tons seven-inch plate. The value of the contract is $1,250,000.

The south steel mill of the Lackawanna Iron & Steel Co., at Scranton, Pa., started on double turn Jan. 17, employing 700 to 800 men. The north mill began on double turn on Jan. 18, and eventually 1,500 men will be at work on steel rails.

The Sterling Steel Works, McKeesport, Pa., idle for some, started Jan. 21 on a $105,000 Government contract calling for 400 13-inch semi-armor piercing shells. Tool steel will be manufactured shortly and a $25,000 rolling mill added to the plant.

An Ohio firm of tin plate manufacturers has notified President Garland that it will sign the revised scale with its 15 and 12½ per cent. reductions. The Amalgamated Association claims that nearly all the mills will soon be running under union auspices.

The Juniata Iron Co.'s rolling mills at Hollidaysburg, Pa., started up Jan. 21 under the control of a company of Harrisburg capitalists. A dispatch says that the company has secured an option on the ore mines and furnace of the McKee's Gap Iron Co., in the same county.

The Prentiss Tool & Supply Co., 57 S. Canal st., Chicago, has recently closed a contract with Lodge & Shipley Machine Tool Co., Cincinnati, for the sale of the latter's complete line

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick.

GOVERNMENT ⁑ STANDARD.

Established 1841. Capacity, 60,000 Per Day; 18,000,000 Per Year.

The First Manufactory of its Kind in the U. S.

Home Office and Works:—MOUNT SAVAGE, Allegany County, Md.

Branch Offices:—No. 1 Broadway, New York, N. Y.; No. 222 So. Third St., Philadelphia, Pa.; Ferguson Block, Pittsburgh, Pa., Stowe, Fuller & Co., 195 Merwin St., Cleveland, Ohio.

THE AMERICAN FIRE BRICK & CLAY CO., Mineral Point, Ohio.

HIGH GRADE FIRE BRICK for

Rolling Mills, Steel Works, Blast Furnaces, Cupola Linings, Boiler Settings.

—All Shapes in Stock—

Our large capacity, 8,000,000 annually, and modern plant, enable us to handle contracts of any size promptly.

Ground or Calcined Clay in Sacks or Bulk.

Stowe, Fuller & Co.

WESTERN AGENTS OF

Mount Savage and Queen's Run Fire Brick,

The leading BRICK of this country.

MANUFACTURERS OF

OHIO FIRE BRICK. ALL SHAPES IN STOCK.

The largest shippers of FIRE BRICK in the West.

Warehouse and Docks: 193-195 Merwin Street, CLEVELAND, OHIO.

of engine lathes. The Chicago company has just received a carload of these tools and will carry a full line of them in stock.

The plate mill of the Republic Iron Works, Pittsburg, which has been idle for months, was started this week to supply the National Tube Works, McKeesport, which is owned by the same company. The plate mill at the National Tube Works broke down and the Republic mill will be run until it is repaired.

The receivers of the Reading Rolling Mill Co. and Cofrode & Saylor, in., of Pottstown, Pa., which were operated under one management previous to the failure, will apply shortly for an order dissolving the receiverships. They expect to transfer the business of the two corporations to the stockholders, possibly by Feb. 1.

The statement in our last issue about the contract for the boilers for the Laughlin Nail Co.'s new plant was not strictly correct. The Totten & Hogg Iron & Steel Foundry Co., of Pittsburg, have the contract for the entire plant, including building and equipment, and the boilers were sublet by them to the Erie City Iron Works.

The Colorado Fuel & Iron Co., of Pueblo, the only producers and manufacturers of iron and steel in Colorado, turned out the following products during the year 1894: Pig iron, 70,961 tons; spiegel, 3,923 tons; castings, 3,109 tons; steel rails, 66,619 tons; spikes, 846 tons; merchant iron, 6,678 tons; steel angle bars, 844 tons; iron ore smelted, 156,997 tons.

The total output of the charcoal, bituminous coal or coke furnaces about Ironton, O., for 1894, is given as 78,876 tons, which was 10,400 tons larger than the product of 1893. The output of the different furnaces was as follows: Belfont, 21,000 tons; Lawrence, 11,000; Sarah, 31,000; Hamilton, 5,885; Pinegrove, 2,291; Mt. Vernon, 2,500; Vesuvius, 1,600; Hecla, 1,600; Olive, 2,000 tons.

New car building: The Southern Railway is asking bids on 500 box cars. The Wisconsin Central is building 50 platform cars at its own shops. The Indiana Car & Foundry Co., Indianapolis, has an order to build 500 stock cars. The Big Four contemplates ordering in the near future 500 box, 500 platform an l 300 coal cars, and will soon be in the market for locomotives.

Beginning Feb. 1 the blooming mills and the Bessemer plant of the Cambria Iron Co., at Johnstown, Pa., will change from a three-shift force of eight hours each, and run two turns of twelve hours each. This change will throw several hundred men out of employment. The condition of business, and the action of similar plants elsewhere, the officials say, have led to the change, although the departments named have been running almost 20 years with the three shifts.

The Ogden, Utah, Chamber of Commerce has accepted the proposition of A. Evans to establish in Ogden a blast furnace and foundries. The proposition in general terms is to invest $150,000 in a plant, work to be commenced within 60 days, the city to pay a bonus of $25,000 therefor, $1,000 at the investment of every $6,000 by Mr. Evans after he has purchased the land. The Chamber of Commerce also accepted a proposition from a company represented by M. R. Hunt of Ashland, Wis., somewhat similar to the one made by Mr. Evans.

The average physical characteristics of 106 test bars taken from 93 open hearth steel castings furnished by the Penn Steel Casting & Machine Co., Chester, Pa., to the Watertown Arsenal were as follows: Elastic limit, 34,300 lbs.; elongation, 21.6%; tensile strength, 74,500 lbs.; reduction of area, 26.6%. These castings ranged in weight from 7,000 to 13,000 lbs. each and all were accepted. The company also manufactures high pressure cast steel steam pipe from six inches up, which is tested up to 1,000 pounds per square inch of pressure. The Narragansett Electric Lighting Co.'s plant at Providence, R. I, is equipped with this cast steel steam pipe and cast steel headers for water tube boilers.

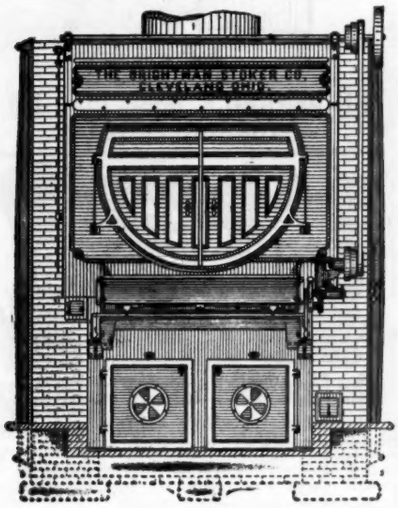
At the receiver's sale of the plant and personal property of the Wellman Iron & Steel Co., Chester, Pa., the real estate was knocked down to J. Tatnall Lea, William Burnham and William G. Neilson, trustees, representing the unsecured creditors, for $17,000 above the bonded indebtedness, or $600,000. These unsecured creditors have claims of over $600,000, and they have affected an organization, headed by the trustees, to purchase and operate the plant. The total realized from the sale was not over $675,000, representing an original investment of over $1,800,000. The prices realized from the sale of some assets were less than one-third the cost of the articles in the market at the present. The scheme of reorganization provides for the issue of stock in the new corporation to the unsecured creditors proportioned to the amount of their claims.

In their trip to the Hocking Valley on Friday, January 18, the members of the Ohio Institute of Mining Engineers visited Bessie Furnace, of the Columbus & Hocking Coal & Iron Co., at New Straitsville, Perry Co., at which a high grade of silvery iron is produced.

Production of spiegeleisen and ferromanganese in the United States in 1894, 120,180 gross tons; in 1893, 81,118 tons.

Another Big Steel Freighter.

A contract was closed last week by the Chicago Ship-Building Co. for another steel steamer of 6,000 tons capacity to be constructed for a syndicate of Chicago and Duluth capitalists. With this steamer there will be built on the Calumet during the winter and spring, four steel boats, with a capacity of 18,000 tons. Outside of the Cramps' yard, near Philadelphia, which is buiiding the steamers for the American line, no single ship-yard in the United States now has this amount of new tonnage under way. The last steamer, for which the contract was closed yesterday, will be 308 feet keel, 405 feet over all, 48 feet beam, and 28 feet molded depth. It will be driven by triple expansion engines, with cylinders, 23, 38 and 62 inches in diameter, by 40-inch stroke. The power will be sufficient ta drive the boat through the water at the rate of fourteen miles an hour. On the completion of the 20-foot channel the new boat will carry 6,000 tons on eighteen feet of water. At the present stage of water iu the locks at Sault Ste. Marie it will carry 4,500 tons without difficulty. The cost of the new boat will be $225,000. The steamer for the Minnesota Steamship Company, the contract for which was let last week, will be ready for service July 1. The boat on yesterday's contract will be ready two weeks later. From now until midsummer 700 men will be employed on the four boats in the Calumet ship-yard. Fair progress has been made on the two big steel schooners for the Minnesota Steamship Company, and both will be launched before spring. It would appear that the chances of higher lake freights are not improving.



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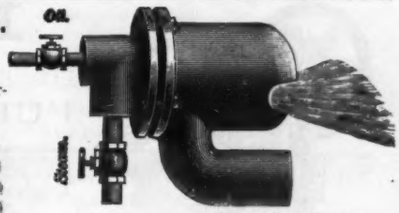

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Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	† 3:25 pm	† 9:50 am
Hudson and Ravenna	* 5:00 pm	* 8:25 am
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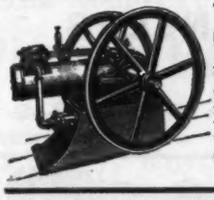

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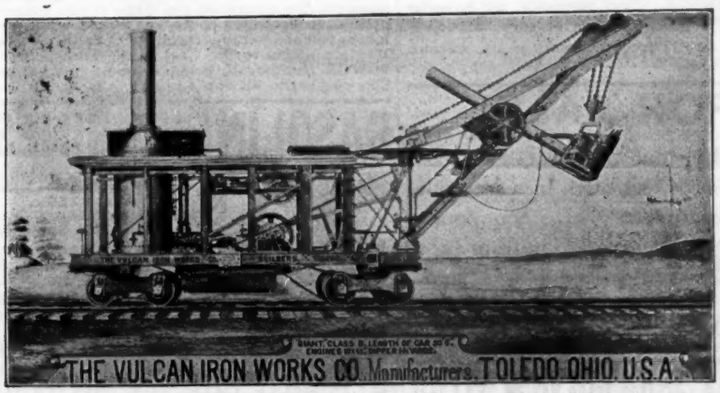

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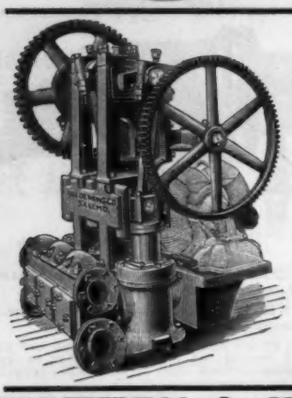

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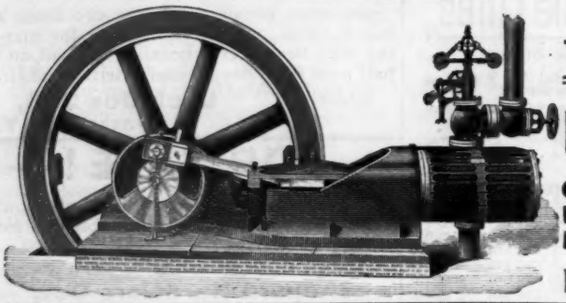

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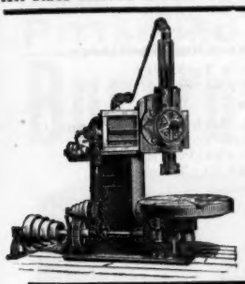

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The John F. Byers Machine Co., Ravenna, O.
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Lane & Bodley Co., Cincinnati, O.
Pen Argyl Iron Works, Pen Argyl, Pa.
Westinghouse Machine Co., Pittsburg, Pa.

Factory Sites—
Chicago Heights Land Association, Chicago.

Fans—
Buffalo Forge Co., Buffalo N. Y.

Files, Makers of—
E. K. Morris & Co., Cincinnati, O.
C. H. Besly & Co., Chicago, Ill.

Fillet—
Milwaukee Fdy. Supply Co., Milwaukee, Wis.

Fire Brick and Clay—
J. V. Rose, Sharon, Pa.
Union Mining Co., Mt. Savage, Md.
Westmoreland Fire Brick Co., Pittsburg, Pa.
Oak Hill Fire Brick & Coal Co., Oak Hill, O.
American Fire Brick & Clay Co., Mineral Point, Ohio.
Reese, Hammond & Co., Bolivar, Pa.
Clearfield Fire Brick Co., Clearfield, Pa.
Milwaukee Fdy. Supply Co., Milwaukee, Wis.
Cleveland Facing Mill Co., Cleveland, O.
Stowe, Fuller & Co., Cleveland, O.

Fire Pails—
Thos. J. Bell & Co., Cincinnati, O.

Fire Proof Covering—
Keasbey & Mattison Co., Ambler, Pa.
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.

Flue Scrapers—
Ed. Wertheim, Chicago.

Foot and Power Lathes—
Prentiss Tool & Supply Co., Chicago, Ill.
W. F. & John Barnes Co., Rockford, Ill.
Hill, Clarke & Co., Chicago, Ill.
New York Machinery Depot, 178 Broadway, New York City.
Lodge & Shipley Machine Tool Co., Cincinnati.

Foundries—
Harn, Ow & Co., Beaver Falls, Pa.
Brightman Stoker Co., Cleveland, O.
The Lloyd-Booth Co., Youngstown, O.
Taylor & Boggis Foundry Co., Cleveland, O.
Wm. Tod & Co., Youngstown, O.
S. Freeman & Sons Mfg. Co., Racine, Wis.
Vulcan Iron Works Co., Toledo, O.

Foundry Supplies—
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Clearfield Fire Brick Co., Clearfield, Pa.
Millett Core Oven Co., Brightwood, Mass.
Ohio Sand Co., Conneaut, O.
Milwaukee Fdy. Supply Co., Milwaukee, Wis.
Cleveland Facing Mill Co., Cleveland, O.
Tabor Mfg. Co., New York City.
The Springfield Cupola Co., Springfield, O.
Chicago Chemical Solution Co., Chicago, Ill.

Forgings—
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Thurman Fuel Oil Burner Co., Indianapolis, Ind

Furnace Linings—
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American Fire Brick & Clay Co., Mineral Point, Ohio.
Milwaukee Fdy. Supply Co., Milwaukee, Wis.

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Brightman Stoker Co., Cleveland, O.
Warren, Webster & Co., Camden, N. J.

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C. H. Besly & Co., Chicago, Ill.

Hoisting and Conveying Machinery—
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Pen Argyl Iron Works, Pen Argyl, Pa.

Hoisting Engines—
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C. W. Hunt Co., New York City.
Pen Argyl Iron Works, Pen Argyl, Pa.
Vulcan Iron Works Co., Toledo, O.

Hot Water Heaters—
United States Heater Co., Detroit, Mich.

House Heaters—
United States Heater Co., Detroit, Mich.

Injectors—
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.

Insurance Companies—
Hartford Steam Boiler I. & I. Co., Hartford, Ct.

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G. B. Schulte Sons Co., Cincinnati, O.
Geo. H. Sibell & Co., Chicago, Ill.
Bethlehem Iron Co., South Bethlehem, Pa.
C. H. Besly & Co., Chicago, Ill.

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Sykes Iron & Steel Roofing Co., Niles, O.
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Condit-Fuller Co., Cleveland.
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Toledo Machine & Tool Co., Toledo, O.
W. F. & John Barnes Co., Rockford, Ill.
H. Bickford, Lakeport, N. H
Hill, Clarke & Co., Chicago, Ill.
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Bickford Drill & Tool Co., Cincinnati, O.
W. F. & John Barnes Co., Rockford, Ill.
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New York Machinery Depot, 178 Broadway, New York City.
Lodge & Shipley Machine Tool Co., Cincinnati.

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Bickford Drill & Tool Co., Cincinnati, O
W. F. & John Barnes Co., Rockford, Ill.
H. Bickford, Lakeport, N. H.
Hill, Clarke & Co., Chicago, Ill.
Cincinnati Milling Machine Co., Cincinnati, O.
Fox Machine Co., Grand Rapids, Mich.
New York Machinery Depot, 178 Broadway, New York City.
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Manufacturers' Tool Supply Co., Chicago.
Gouverneur Machine Co., Gouverneur, N. Y.
C. H. Besly & Co., Chicago, Ill.

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C. H. Besly & Co., Chicago, Ill.

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Hill, Clarke & Co., Chicago, Ill.
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New York Machinery Depot, 178 Broadway. New York City.
Lodge & Shipley Machine Tool Co., Cincinnati

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American Mining & Machinery Co., Cleveland
C. W. Hunt Co., New York City.
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Vulcan Iron Works Co., Toledo, O.
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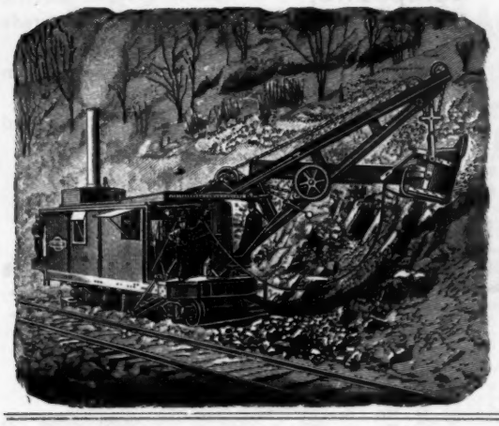

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Cleveland Facing Mill Co., Cleveland, O.

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C. H. Besly & Co., Chicago, Ill.

Oil Pumps—
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C. H. Besly & Co., Chicago, Ill.

Ore Crushers—
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Packing—
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C. H. Besly & Co., Chicago, Ill.

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Iron Clad Paint Co., Cleveland.
Jos. Dixon Crucible Co., Jersey City, N. J.
Empire Paint & Roofing Co., Philadelphia, Pa.

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Harrington & King Perforating Co., Chicago, Ill
Aitchison Perforated Metal Co., Chicago.
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Millett Core Oven Co., Brightwood, Mass.

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Hill, Clarke & Co., Chicago, Ill.
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Lodge & Shipley Machine Tool Co., Cincinnati.

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Fox Machine Co., Grand Rapids, Mich.
C. H. Besly & Co., Chicago, Ill.

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Edward Brown, Philadelphia, Pa.

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Totten & Hogg I. & S. F'dry Co., Pittsburg, Pa.

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Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Ltd., Carbondale, Pa.

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Bertsch & Co., Cambridge City, Ind.
Fox Machine Co., Grand Rapids, Mich.
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Steam Engines and Boilers—
Pen Argyl Iron Works, Pen Argyl, Pa.

Steam Packing—
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.

Steam Pipe and Boiler Covering—
Keasbey & Mattison Co., Ambler, Pa.
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.

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Bucyrus Steam Shovel & Dredge Co., Bucyrus, O.
Vulcan Iron Works Co., Toledo, O.

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Lunkenheimer Co., Cincinnati, O.
C. H. Besly & Co., Chicago, Ill.

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Wm. Jessop & Sons, Ltd., New York, N. Y.

Steel Castings—
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Brightman Stoker Co., Cleveland, O.

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Cleveland City Forge & Iron Co., Cleveland.

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Enterprise Boiler Co., Youngstown, O.

Tinning Machinery—
The Lloyd-Booth Co., Youngstown, O.

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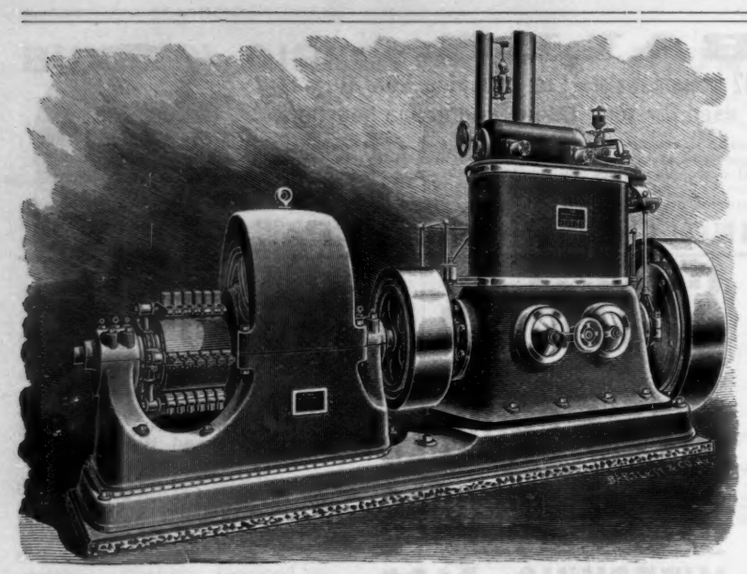

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The star (*) indicates that the adv. appears alternate weeks; the dagger (†) once a month; the double dagger (‡) once in three weeks; the parallel (‖) three times out of four.

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No. 2 Strong Foundry	10 00@ 10 25
No. 1 Gray Forge, red short	9 10@ 9 25
No. 2 Gray Forge, neutral	9 00@ 00 00
No. 1 American Scotch	11 25@ 00 00
No. 2 American Scotch	10 25@ 00 00
Lake Superior Charcoal	12 50@ 13 00
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No. 1 Foundry	$11 25@$11 75
No. 2 Foundry	10 25@ 10 75
Gray Forge	9 50@ 9 75
White and Mottled	9 00@ 9 25
Warm Blast Charcoal	18 00@ 19 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	10 65@ 00 00
CHICAGO (reported by our representative:)	
Lake Superior Charcoal	$13 00@$14 50
Local Coke Foundry No. 1	10 25@ 10 50
Local Coke Foundry No. 2	9 75@ 10 00
Local Coke Foundry No. 3	9 40@ 9 65
Local Scotch Foundry No. 1	10 25@ 10 50
Local Scotch Foundry No. 2	9 75@ 10 00
Local Scotch Foundry No. 3	9 50@ 9 75
Southern Coke No. 1	11 00@ 11 25
Southern Coke No. 2	10 00@ 10 50
Southern Coke No. 3	9 75@ 10 25
Southern No. 1 Soft	10 00@ 10 50
Southern No. 2 Soft	9 75@ 10 25
Southern Silveries No. 1	11 50@ 11 75
Southern Silveries No. 2	11 25@ 11 50
Jackson Co. Silveries	15 00@ 16 00
Ohio Silveries No. 1	14 00@ 14 50
Ohio Silveries No. 2	13 00@ 13 50
Ohio Strong Softeners	12 50@ 13 00
Alabama Car Wheel	17 50@ 18 00
Malleable Bessemer	11 00@ 11 50
Coke Bessemer	11 00@ 11 50
CINCINNATI (reported by Rogers, Brown & Co.)	
Southern Coke No. 1, Foundry	$ 9 75@$10 00
Southern Coke No. 2 and No. 1 Soft	9 25@ 9 50
Hanging Rock Coke, No 1	12 00@ 12 50
Hanging Rock Charcoal No. 1, Fdy	16 00@ 17 00
Tennessee Charcoal No 1	14 00@ 14 55
Jackson County Stone Coal No 1	14 50@ 15 00
Southern Coke, Gry Forge	8 50@ 8 00
" " Mottled	8 25@ 8 75
Standard Alabama Car Wheel	15 75@ 16 50
Tennessee " "	15 50@ 16 70
Lake Superior " "	14 00@ 14 05
BUFFALO (reported by Rogers, Brown & Co.)	
No. 1 Foundry Strong Coke Iron Lake Superior Ore	$11 25
No. 2 Foundry Strong Coke Iron Lake Superior Ore	10 75
Ohio Softener No. 1	11 75
Jackson Co. Silvery No. 1	15 75
Lake Superior Charcoal	13 75
Southern Soft No. 1	11 25
Hanging Rock Charcoal	18 50
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Southern Coke No. 2	10 00@ 10 25
Southern Coke No. 3	9 75@ 10 00
Southern Gray Forge	9 50@ 9 75
Southern Charcoal No. 1	14 00@ 14 50
Missouri Charcoal No. 1	12 50@ 13 00
Ohio Softeners	14 00@ 14 50
Lake Superior	15 50@ 16 00
Southern	16 75@ 17 00
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Works and Mines, Westmoreland, Pa

DIXON'S GRAPHITE PAINT
FOR TIN OR SHINGLE ROOFS AND IRON WORK. IT IS ABSOLUTELY WITHOUT AN EQUAL.
Tin roofs well painted have not required repainting for 10 to 15 years.
If you need any paint it will pay you to send for circular.
JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

IRON CLAD PAINT CO.
Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g,
CLEVELAND, OHIO.

Trade Mark Patented.

ORDER DIRECT FROM THE
Iron Clad Paint Co.
And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.
IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.
FURNISHED both Dry and Ground in Oil
USED BY NEARLY ALL THE RAILROADS.

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. mill)	1.25c@1.35c
Angles	1.20c@1.25c
Tees	1.35c@1.45c
Universal Plates	1.20c
Sheared Plates	1.30c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 30
4¼ to 6 by ⅜ to 1 inch	1 35
1¾ to 6 by 1¼ to 2 inch	1 50
1¼ & 1¾ by ⅜ to ¾ inch	1 35
1 & 1¼ by ⅜ to ¾ inch	1 40
⅝, ¾, ⅞, by ⅜ to ⅝ inch	1 50

Round and Square.

1 to 1⅞ inch	1 30
2 to 2⅜ inch	1 40
2¼ to 3¼ inch	1 55
3⅜ to 4 inch	1 80
4¼ to 4½ inch	2 40
4¾ to 5 inch	2 60

Oval.

⅜ to 1¼ inch	1 50
½ to ¾ inch	1 50
½	1 70
⅜	1 90

Half Oval and Half Round.

1⅛ to 3 inch	1 85
⅞ to 1¼ inch	1 65
⅜ to ¾ inch	1 90
½	2 05
⅜	3 15

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 40
1 to 1¾ by ¼ and 5-16 inch	1 45
¾ to ⅞ by ¼ and 5-16 inch	1 55
½ to ⅝ by ¼ and 5-16 inch	1 80

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	1 85
1 7-16 to 2, No. 17, 18 and 19	1 90
1 7-16 to 2, No. 20	2 00
1 7-16 to 2, No. 21	2 10
1 7-16 to 2, No. 22	2 20
1⅛ to 1¾, No. 13, 14 and 15	1 90
1⅛ to 1¾, No. 16, 17 and 18	1 95
1⅛ to 1¾, No 19 and 20	2 00
1⅛ to 1¾, No. 21	2 10
1⅛ to 1¾, No. 22	2 20
15-16 and 1 inch, No. 13, 14 and 15	1 85
15-16 and 1 inch, No. 16, 17 and 18	2 00
15-16 and 1 inch, No. 19 and 20	2 10
15-16 and 1 inch, No. 21	2 20
15-16 and 1 inch, No. 22	2 30
⅞, No. 13, 14 and 15	2 10
⅞, No. 16, 17 and 18	2 20
⅞, No. 19 and 20	2 30
⅞, No. 21	2 40
⅞, No. 22	2 50
13-16, No. 13, 14 and 15	2 20
13-16, No. 16, 17 and 18	2 30
13-16, No. 19 and 20	2 40
13-16, No. 21	2 50
13-16, No. 22	2 60
¾, No. 13, 14 and 15	2 30
¾, No. 16, 17 and 18	2 45
¾, No. 19 and 20	2 55
¾, No. 21	2 65
¾, No. 22	2 75
11-16, No. 13, 14 and 15	2 55
11-16, No. 16, 17 and 18	2 60
11-16, No. 19 and 20	2 70
11-16, No. 21	2 80
11-16, No. 22	2 90
11-16, No. 23	3 00
⅝, No. 13, 14 and 15	2 60
⅝, No. 16, 17 and 18	2 70
⅝, No. 19 and 20	2 80
⅝, No. 21	2 90
⅝, No. 22	3 00
⅝, No. 23	3 10
9-16, No. 13, 14 and 15	2 80
9-16, No. 16, 17 and 18	2 90
9-16, No. and 20	3 00
9-16, No. 21	3 10
9-16, No. 22	3 20
9-16, No. 23	3 30
7-16 and ½ inch, No. 13, 14 and 15	3 00
7-16 and ½ inch, No. 16, 17 and 18	3 10
7-16 and ½ inch, No. 19 and 20	3 20
7-16 and ½ inch, No. 21	3 30
7-16 and ½ inch, No. 22	3 40
7-16 and ½ inch, No. 23	3 50
⅜, No. 13, 14 and 15	3 50
⅜, No. 16, 17 and 18	3 60
⅜, No. 19 and 20	3 70
⅜, No. 21	4 00
⅜, No. 22	4 10
⅜, No. 23	4 25

Light Band.

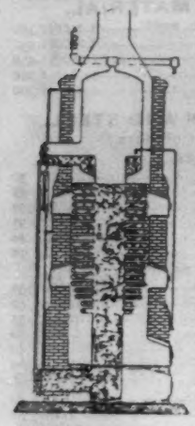
1⅛ to 6 by ⅛ to 3-16 inch	1 60
1¼ to 6 by Nos. 11 and 12	1 65
1 to 1⅜ by ⅛ to 3-16 inch	1 65
1 to 1⅜ by Nos. 11 and 12	1 70
⅞ and 13-16 by ⅛ to 3-16 inch	1 80
⅞ and 13-16 by Nos. 11 and 12	1 85
¾ and 11-16 by ⅛ to 3-16 inch	1 90
¾ and 11-16 by Nos. 11 and 12	1 95
⅝ and 9-16 by ⅛ to 3-16 inch	2 05
⅝ and 9-16 by Nos. 11 and 12	2 10
½ by ⅛ to 3-16 inch	2 20
½ by Nos. 11 and 12	2 25

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	1 80
⅞ inch, " " " " 13 and 14	1 90
¾ inch, " " " " 11 and 12	1 95
¾ inch, " " " " 13 and 14	2 15

Sheet Iron.

No. 10	1 85
No. 12	1 90
No. 14	1 95
No. 15-17	2 05
No. 18	2 20
No. 20	2 30
No. 22-24	2 40
No. 25-26	2 50
No. 27	2 60



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WATER TUBE BOILER.

This Boiler is absolutely safe from explosion. Gives as much steam from the waste heat as any boiler made. Easy of access for cleaning and repairs. Furnishes perfectly dry steam. Occupies little ground space. Economical in first cost. Send for complete circulars giving list of users and testimonials, one of which is printed below.

The Falcon Tin Plate & Sheet Co.,
NILES, O., Aug. 18, 1893.

Chas. P. Adams, Esq.

Dear Sir: The three boilers of 225 H. P. each which you furnished us are working in every way satisfactory. We consider them as good steamers as any we have ever used. Up to the present time have spent nothing on them for repairs. Very respectfully,

THE FALCON TIN PLATE & SHEET CO.,
By Warner Arms, Pres't.

C. P. ADAMS.
807 The Cuyahoga, - CLEVELAND. O.

C. W. HUNT COMPANY,
45 Broadway, New York,
MANUFACTURERS OF

Engineers' and Contractors' MACHINERY
For Hoisting and Conveying Purposes.

SECTIONAL TRACK, INDUSTRIAL AND CABLE RAILWAYS.
BARROWS, COAL BUCKETS, WIRE ROPE, TIP CARS, ETC.

CLEVELAND ROLLING MILL CO.,
CLEVELAND, - OHIO,
—MANUFACTURERS OF—
BESSEMER AND OPEN-HEARTH STEEL,

Blooms, Billets, and Slabs, Steel Rails, Steel Beams, Channels and Angles. Steel Forgings, Bar Spring, and Sleigh Shoe Steel. Steel Wire of all kinds. Barbed Wire, Iron and Steel Plates, Galvanized and Black Sheet Iron and Steel Corrugated Iron Roofing.

MILLETT'S PATENT PORTABLE CORE OVEN.

THE BEST CORE OVEN
On the Market.

Saves Fuel,
" Expense,
" Time.

Does More Work and
Makes Better Cores.

If you make
small cores
you need it.

Write us for Circulars and Prices.

MILLETT CORE OVEN CO.,
Brightwood, (Springfield) Mass.

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THE UPSON NUT CO., Manufacturers of Nuts, Washers, Carriage, Machine, Plow and Elevator Bolts, Coach Screws, etc.

Steel Stamps and Stencils.

FLEHARTY, J. H. & Co., Rubber Stampes Seals, Stencils, Automatic Check Punchs, and Numbering Machines. 92 Seneca St.

Steel Boiler Plates—1-4 in. and Heavier.

Tank	1 60
Shell	1 85
Flange	2 10
Marine Flange	2 35
Fire Box	3 35

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. ℔. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. ℔s.
1 to 2 in, inclusive	08
9-16 to ⅞ in. "	08½
7-16 to ⅜ and 2⅜ to 3 in	09
3⅛ to 4 in	09½
⅜ to 11-16 and 4½	10
⅞ to 6 in	10½
¾ to 9-32 and 6¼ to 7 in	11
-16 in	13

3

Flats.

	cts. ℔s.
2 to 9-16 in. wide by 2 to ⅜ thick	8

Bessemer and O. H. Steel.

Machinery	base price,	1 80
Tire	"	1 85
Spring	"	2 20
Sleigh Shoe	"	2 20
Toe Calk	"	2 05
Cutter Shoes, tapered and bent	"	2 45

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

⅛, ¼, 11-16 and ⅜ inches diameter	3 70
Bridge ⅛, ¼, 11-16 and ⅜ inch diam	3 40

MACHINERY SUPPLY MARKET.

Anvils.

American	℔ 9@10
Wright's	℔ 12

Bellows.

Blacksmiths'	Hill's	dis 40
	Bullock's	dis 50&10
Moulders'		dis 40@40&10
Hand		dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single,	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis 45

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis 35
Horton's Universal	dis 40
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

Cast Steel	℔ 3½
Iron, steel points	℔ 1b 3

Drill and Drill Sockets.

Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1⅛"	dis 50&10
Morse Taper and Straight Shank Larger than 1⅛"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 55@55&5
Cleveland " "	dis 55@55&5

Emery.

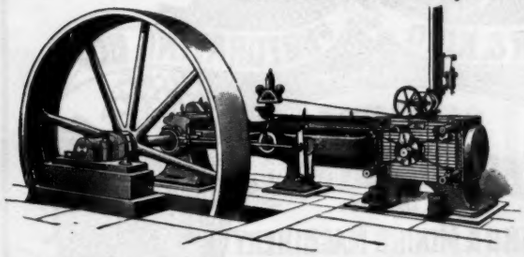
	No. 4 to 46 gr.	No. 54 to 150 gr.	Flour, C. F. F. FF.
Kegs, ℔	4½c	5 c	2½c
½ kegs ℔	4¾c	5¾c	2¾c
¼ kegs ℔	5 c	5½c	3 c
10 ℔ cans, 10 in case	6 c	6½c	5 c
10 ℔ cans less than 10	10 c	10 c	7½c

Files.

Arcade	dis 60&10@60&10&10
Nicholson	dis 60&10@60&10&10
" X. F.	dis 25
Kearney & Foot	dis 60&10@60&10&10
Black Diamond	dis 60&10@60&10&10
McClellan	dis 60&10@60&10&10
Disston's	dis 65@70

THE LANE & BODLEY CO.,

CINCINNATI, OHIO.



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ALL SIZES.

Simple and Compound.

Shafting, Hangers, Pulleys.

Belt Elevators, Saw Mills.

Have You Any Sand?

On your castings that you want removed?

If so,

Will clean them better than any other method.

Try It.

Chicago Chemical Solution Mfg. Co.

41 Lakeside Bldg., CHICAGO, ILL.

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The Industrial Centre of Chicago

offers **Free Factory Sites** and other inducements.

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City Office 137 Superior St.

	Arrive.	Depart.
Akron & Canton	*6:30 P M	*7:10 A M
Akron, Canton & Valley Jctn.	*10:10 A M	*3:15 P M
Valley Jctn. & Way Stations	†6:30 P M	†7:10 A M
Akron, Canton & Chicago	*8:00 A M	*6:30 P M
Wooster and Chicago	†2:45 P M	†11:00 A M
Wooster		*6:30 P M
Akron, Canton & Marietta	†2:45 P M	†11:00 A M
Steubenville, Wheeling, Washington, D. C., and Baltimore	†2:45 P M	†11:00 A M

†Daily except Sunday. *Daily. Pullman's Palace Vestibule Drawing Room cars between Cleveland and Chicago.

JOHN FRASER,

MECHANICAL ENGINEER and DESIGNER of

STEAM AND HYDRAULIC MACHINERY.

DESIGNING FOR

Steel Works, Rolling Mills and Blast Furnaces

A SPECIALTY.

1436 Monadnock, - - CHICAGO.

NEW

Shop-worn machinery is not worth so much to us for our show rooms as if it were bright and fresh.

But there's **no difference** in the **work** it can do.

We have several new, standard, shop-worn machine tools, in our store for a year or so, that we wish to sell to make room for bright samples.

Will you take one, if we make the **price right?**

Send for descriptive list.

HILL, CLARKE & CO.,

Machinery Merchants,

155 Oliver St., BOSTON. 12 and 14 Canal St., CHICAGO.

A growing circulation among machine shop and foundry firms, has

THE IRON TRADE REVIEW.

Western	dis 70
Stub's	dis 25
Grobet's	dis 30
Reynolds Bros.' Hand Cut	dis 50
Industry File Works Hand Cut	dis 50

Hammers.

P. S. W	dis 40
Atha new list, Jan. 15, 1887	dis 50
Heavy hammers and sledges under 5 lbs.	12c
" " " over 5 lbs.	10c

Jack Screws.

Illinois Bolt Co. list	dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¾	4	3½	3⅛
Hexagon	15⅝	11⅛	8½	6	5¼	5¼	
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ℔ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887	dis 85
Standard Penny Nails, ℔ keg card rate	
Car lots	$1.10
Less than car lots	$1.25

Oilers.

Zinc and Tin	dis 60
Brass and Copper	dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ℔ doz	dis 10@10&10

Packing, Steam.

Boston Belting Co.	dis 60
American Packing Hemp	℔ lb 9@10
Russia " "	℔ lb 14
Italian " "	℔ lb 13@19
Plumbago Piston	℔ lb 40
Peerless	℔ lb 60
Morrison's "	℔ lb 45
Square Flax "	℔ lb 50
Sheet Rubber	℔ lb 12&24
Excelsior Rubber	℔ lb 48
Rainbow, Full Rolls	45c ℔ lb
Rainbow, Less than Full Rolls	50c ℔ lb
Eclipse Gasket	℔ lb 75

Picks.

Railroads, 5 to 6 lbs	$12 dis 60
" 6 to 7 lbs	$13 dis 60

Pulleys.

Iron Pulleys, Walker List	dis 50
Medart Pulleys	dis 50
Split Wood Pulleys	dis 55@60

Rivets.

Iron, Thousand, list November 17, 1887	dis 50&10@60
Iron, Ordinary, Cooper's Block and Carriage list November 17, 1887	dis 50&10@60
Copper	dis 50@50&10

Saws.

Disston's Circular	dis 40&10
" Band	dis 25
" Scroll	Net
Hack Saw Stubs	dis 20
" " Eureka	dis 20
" " Star	dis 20
Saw Swages Diston's	dis 30
Atkins' Circular Saws	dis 40&45
" Mill, Mulay and Drag Saws	dis 40&10
" Wood Saws	dis 40&10
" Silver Steel Diamond Cross-cut Saws	70c per ft
" Dexter Cross-cuts	50c "
" Diamond "	30c "
" Tuttle Tooth Cross-cuts	25c "
" One-man Cross-cuts	32c "
No. 1 Handles	23c per pair
No. 6 "	16c "
Excelsior Saw Tools	$6 per doz
Derfection "	$15 "
Petroit Saw Works, Circular	dis 50
" " " Band	dis 25
" " " Mulay	dis 45

Taps.

Cards, Hand and Nut to 2 in	dis 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2¼ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 60
Parker's	dis 20@25
Prentiss	dis 20
Stephen's	dis 25@30
Barrett's	dis 30
Miller's Falls	dis 40
Merrill's	dis 15@20
Howard	dis 35

Wire.

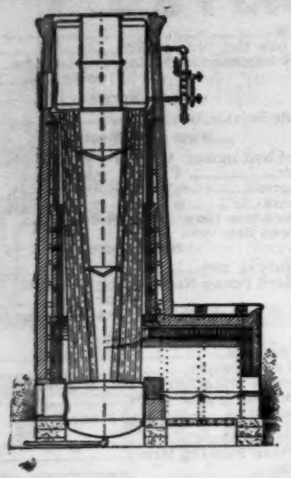
New List, Apr. 9, 1894

Brass	dis 40
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65& 5
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ℔ lb dis 30

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " "	dis 25
Alligator " "	dis 40

"CAHALL"



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Best in the World.

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Highest Efficiency. Lowest Price.

Leads all makes of boilers in economy, capacity, ease of examination, cleaning and repairs. Send for description, tests, references and estimate before you purchase.

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933 Rookery, CHICAGO, ILL.

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Best Quality — At Reduced Prices.

CARBONS
BLACK DIAMONDS
FOR
DIAMOND DRILLS.

S. D. DESSAU,
IMPORTER,
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New York

$14.00 Per Carat. — $14.00 Per Carat.

Subscribe for The IRON TRADE REVIEW.

STEEL, IRON, COPPER, ZINC, BRASS, TIN,

And all Other Metals Perforated as Required for

GRAIN CLEANING AND MINING MACHINERY,
WOOLEN, COTTON, PAPER AND PULP MILLS,
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SPARK ARRESTERS, GAS AND WATER WORKS,
OIL, GAS AND VAPOR STOVES,
COFFEE MACHINERY, ETC., ETC.

STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.

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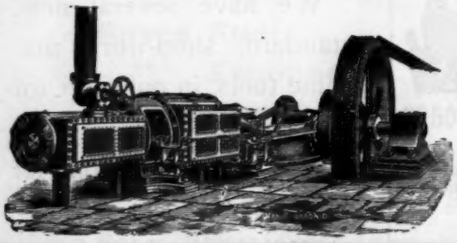
WILLIAM TOD & CO.

YOUNGSTOWN, OHIO.

THE PORTER-HAMILTON ENGINE

SINGLE, COMPOUND & CONDENSING



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Heavy Special Machinery.

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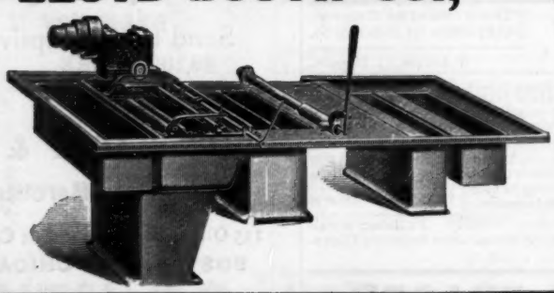
THE LLOYD-BOOTH CO., YOUNGSTOWN, OHIO.

Tinning MACHINERY.



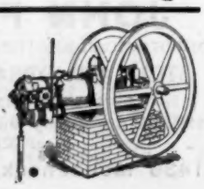
Rolling Mills, Sand and Chilled ROLLS.

POWER From **GAS OR GASOLINE.**

No Steam, Coal, Ash, Gauges, Engineer nor Danger.

From 1 to 120 horse-power. } **Can be Used in City or Country.**

THE OTTO GAS ENGINE WORKS,

33d and Walnut Sts., PHILADELPHIA, PA.

S. M. York, 42 S. Water St., Cleveland Agent.